VOLUME 10 · NUMBER 10 · *October 1955*

Geriatrics

DEVOTED TO DISEASES AND PROCESSES OF AGING

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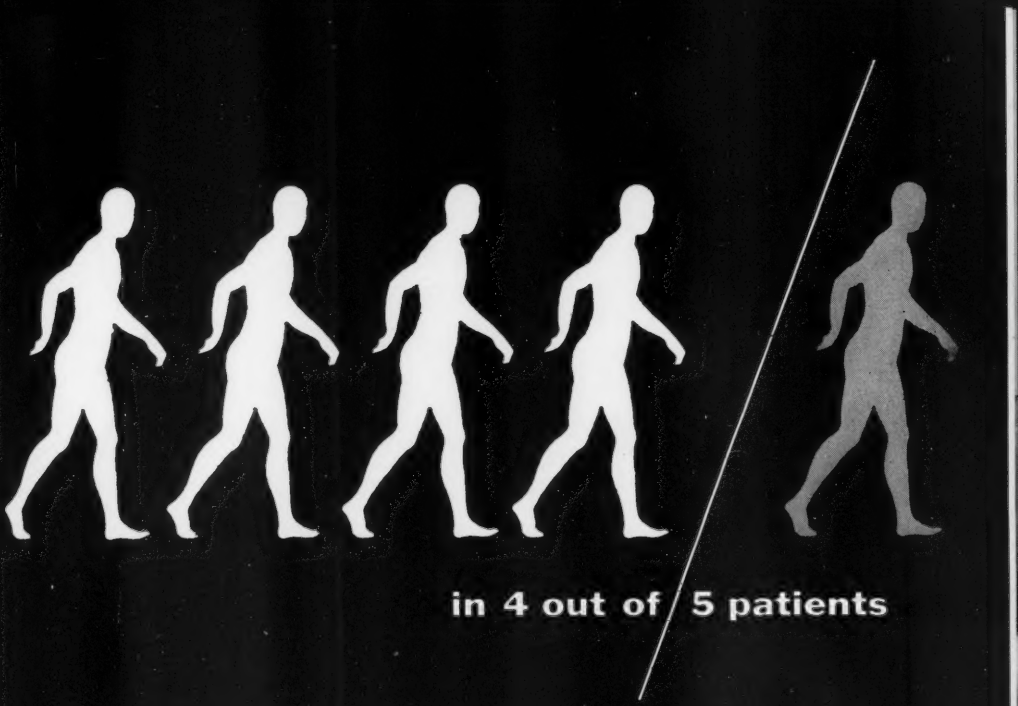

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References:
1. Winsor, T., Humphreys, P.: Angiology *3*:1 (Feb.) 1952.
2. Plotz, M.: N. Y. State J. Med. *52*:2012 (Aug. 15) 1952.
3. Dailheu-Geoffroy, P.: L'Ouest-Médical, vol. 3 (July) 1950.
4. Russek, H. I., *et al.*: Am. J. M. Sc. *229*:46 (Jan.) 1955.

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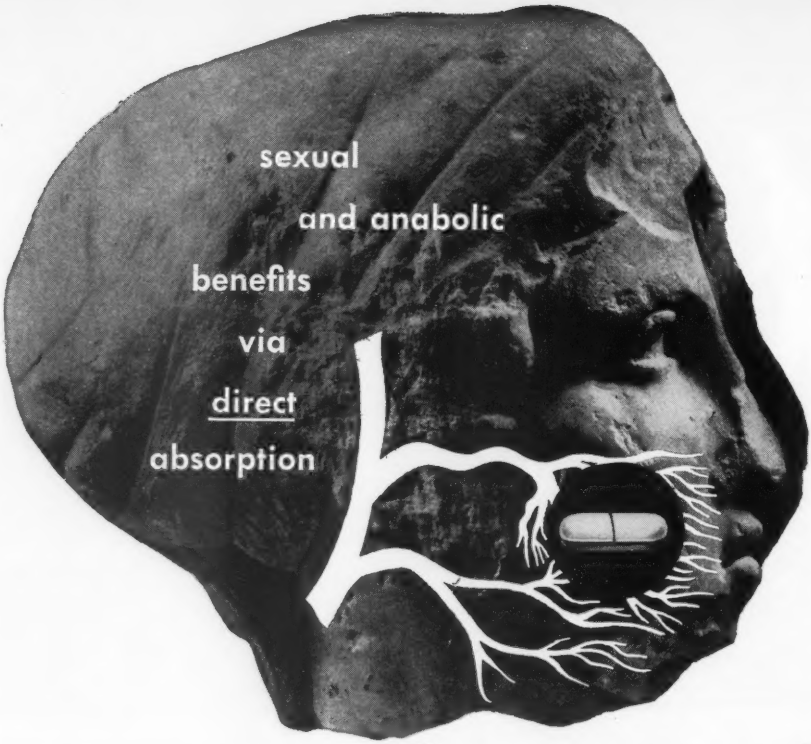

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Geriatrics

Volume 10

Established 1946
Number 10

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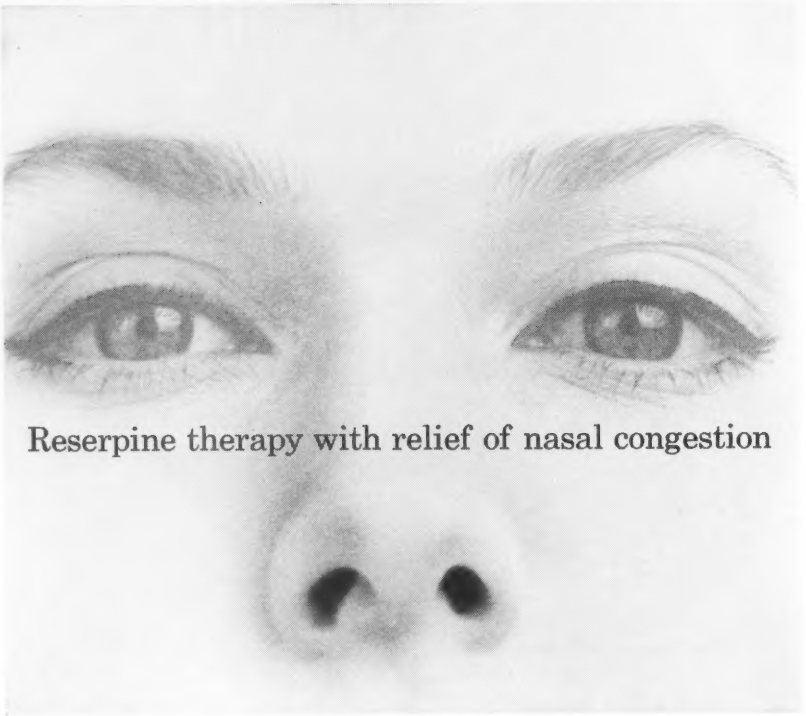

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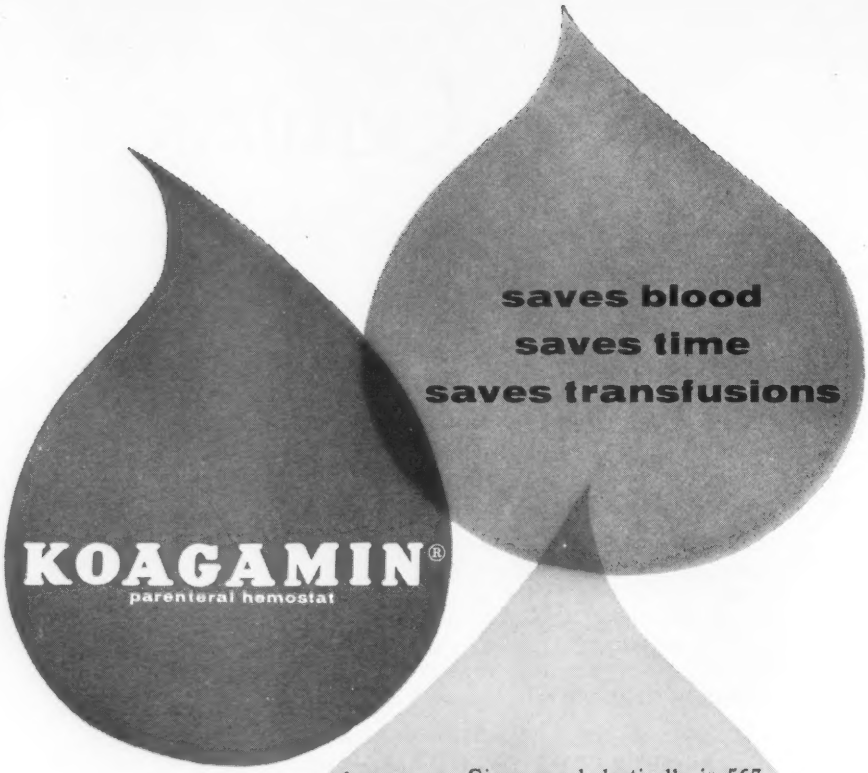

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1. Eisfelder, H.W.: Am. Pract. & Dig. Treat., 5:778 (Oct.) 1954. 2. Sebrell, W.H., Jr.: J.A.M.A., 152:42 (May) 1953. 3. Sherman, R.J.: Medical Times, 82:107 (Feb.) 1954.

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...looking forward

• The Beck operation for coronary artery disease is a safe and effective method for distributing available coronary arterial blood supply to the heart. Writing in the November issue of Geriatrics, B. L. Brofman, director of cardiovascular research, Mount Sinai Hospital, Cleveland, discusses the results of *Surgical Treatment for Coronary Artery Disease* in a series of 70 consecutive patients. Of the last 55 patients undergoing surgery, 3 died in the immediate postoperative period, giving an operative mortality rate of 5.5 per cent. In a series of 44 consecutive patients followed for nine months to three years, 37, or 84 per cent, are working full time or significantly more than before operation.

• Harry R. Butcher, Jr., of the Department of Surgery, Washington University School of Medicine, St. Louis, compares three methods of therapy for *Stasis Ulcers* which have been used at Barnes Hospital in St. Louis. The most effective treatment has been found to be ligation, excision, or stripping varicose veins and the immediate split grafting of the cutaneous defect after excision of the ulcer and all thickened skin and fascia about it. Although older persons are most commonly subject to stasis ulcers, age is not relatable to success or failure in treatment.

• A determination was made of *The Total Spinal Fluid Protein Concentration in Patients Over 65*, with no known diseases or conditions that could influence the protein level. M. J. Madonick and F. Weissman of the Department of Neurology, New York Medical College, found that old age does not cause an increase in the spinal fluid protein values, nor does confinement to bed significantly alter the protein concentration. The mean spinal fluid protein concentration was 33.81 mg. per 100 cc. for the 75 men and 33.80 mg. per 100 cc. for the 45 women in the series.

• *Geriatric and Rehabilitation Services in Denmark, Norway, and Sweden* are described by Herman E. Hilleboe, commissioner of health of the state of New York, who visited these countries in the summer of 1954. He finds that socialization of health, education, and welfare has made possible some interesting patterns in geriatric and rehabilitation services. Geriatric services are tied in with general hospital, nursing homes, homes for the aged, and old people's flats. Rehabilitation of the aged is given high priority. The Scandinavian experts agree that programs for the chronically ill and disabled should be under the direction of specially trained physicians.

• The preoccupation with means for prolonging the life span is inevitably linked with the *Quest for Rejuvenation*, according to Sona Rosa Burstein, anthropologist of the scientific staff of Wellcome Historical Medical Museum, London. In this third article of the series, *The Historical Background of Gerontology*, she discusses the search for the renewal of youth from the early alchemists working to produce the philosopher's stone to the scientists of the late nineteenth century, conducting the first laboratory experiments with extracts from the endocrine glands.

For these and other articles, reviews, abstracts, and special features, read every issue of Geriatrics.

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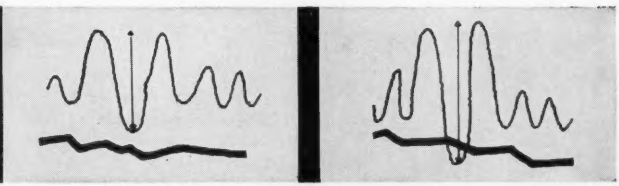

Spirogram before Choledyl therapy. Note markedly diminished vital capacity.

Spirogram after Choledyl therapy. Note in particular 44% increase in vital capacity.

Based upon Dann, S., et al.: Internat. Rec. Med. & Gen. Pract. Clin. 167: 265, 1954.

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of patient
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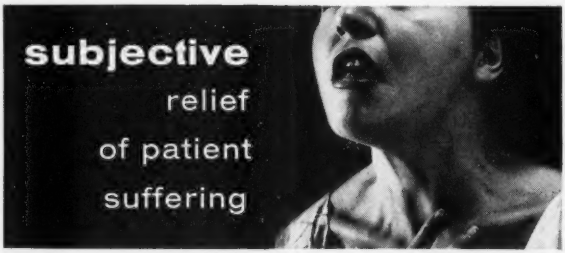

Asthmatic (E.C.) before Choledyl therapy.

Patient (E.C.) after Choledyl therapy "less wheezing; chest less tight."

Based upon Dann, S., et al.: Internat. Rec. Med. & Gen. Pract. Clin. 167: 265, 1954.

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1. Brown, E. A., and Clancy, R. E.: Presented at the Eleventh Congress of the American College of Allergists, April 29, 1955, Chicago, Illinois. To be published.

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†Kountz, W. B.: J.A.M.A. *153*:777 (Oct. 31) 1953.

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Winkelman, N.W., Jr.: J.A.M.A. 155:18 (May 1) 1954

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Howell, T.H.; Harth, J.A., and Dietrich, M.: Practitioner 173:172 (Aug.) 1954

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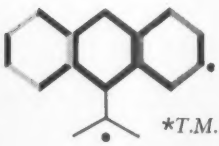

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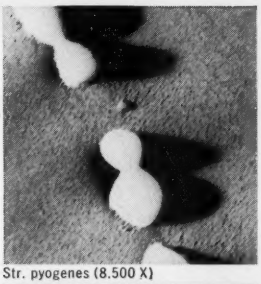

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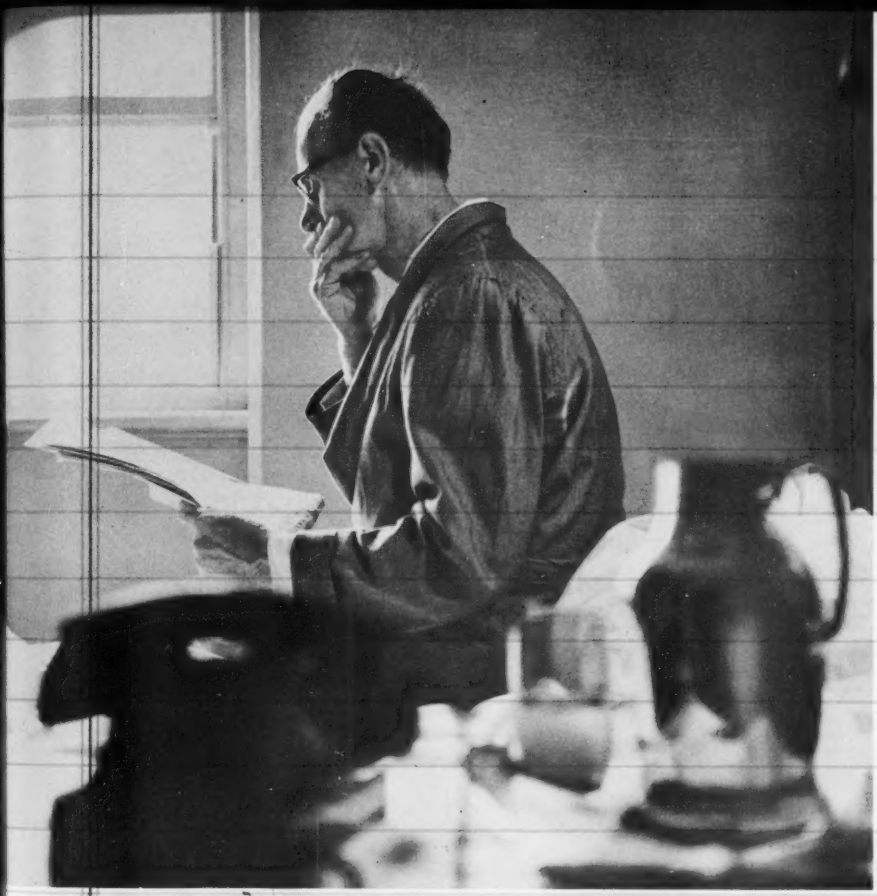

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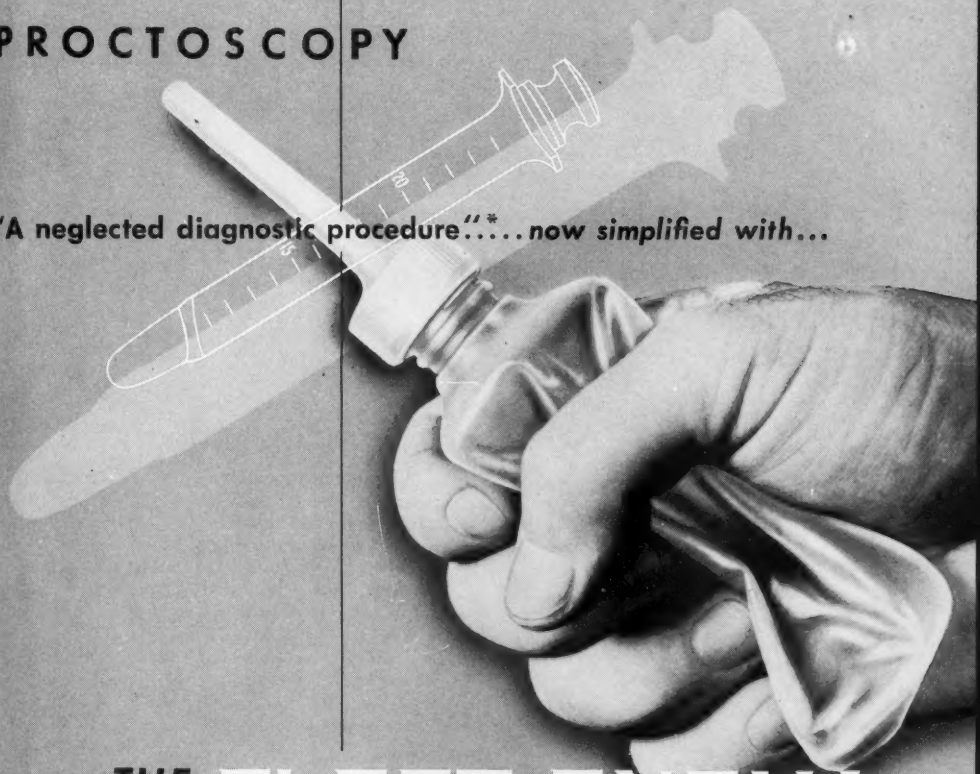

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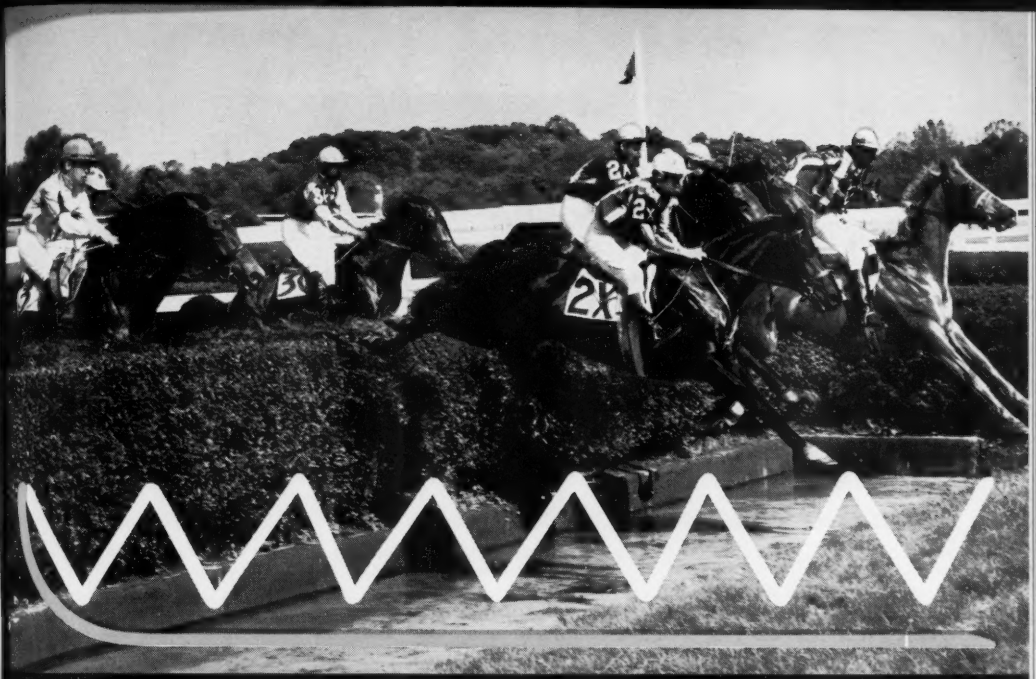
Pavatrine® with Phenobarbital for selective control of smooth muscle spasm and for mild sedation of the nervous, tense patient is an excellent adjuvant in the management of biliary disorders. The average dose is one or two tablets three or four times daily, as needed.

Pavatrine with Phenobarbital contains 125 mg. (2 grains) of Pavatrine and 15 mg. (¼ grain) of phenobarbital per tablet. G. D. Searle & Co., Research in the Service of Medicine.

1. Irvin, J. L.: The Secretion and Enterohepatic Circulation of Bile Acids: Replacement of Bile Acids in Biliary Insufficiency, North Carolina M. J. *13*:206 (April) 1952.

SEARLE



Edema Control Need Not Be a Steeplechase

Steeplechase diuresis is up-and-down diuresis—patient dry, patient waterlogged.

In contrast, the THIOMERIN regimen offers *straightline* control . . . with maximal *spread* between injections. Parenteral THIOMERIN to initiate diuresis is supplemented by THIOMERIN Suppositories to space out the injections, to prevent fluid accumulation, to maintain dry weight.

THIOMERIN Suppositories promote flat-plane management . . . with little likelihood of mercurialism, rectal irritation, or local discomfort.[1]

Supplied: THIOMERIN Suppositories, boxes of 12.
Also available: Injection THIOMERIN Solution, vials of 2 cc., boxes of 12; vials of 10 cc. Injection THIOMERIN (Lyophilized), vials of 1.4 Gm.; vials of 4.2 Gm.

1. Daly, J.W.: Am. J. M. Sc. *228*:440 (Oct.) 1954

INJECTION RECTAL SUPPOSITORIES
THIOMERIN® SODIUM
MERCAPTOMERIN SODIUM

Wyeth®
Philadelphia 2, Pa.

Effective local treatment

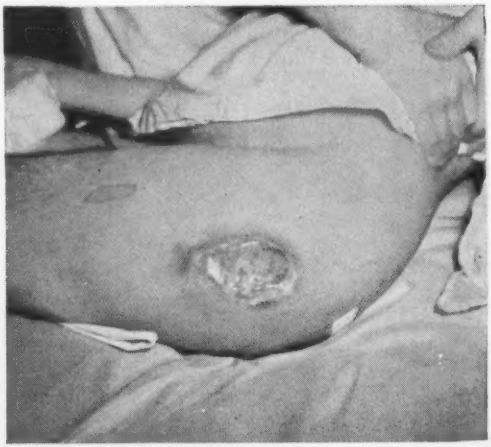
FOR BEDSORES AND OTHER CHRONIC ULCERATIONS

May 15th. Severe decubitus ulcer over femoral greater tuberosity in a terminally ill patient.

WHITE'S VITAMIN A & D OINTMENT

Routine application of White's Vitamin A & D Ointment promotes granulation and epithelization in *stubborn bedsores, chronic ulcers of varied etiology, burns and slow-healing wounds* that do not permit primary surgical closure. It is also useful as a protective and therapeutic covering in miscellaneous skin conditions characterized by abnormal dryness. White's Vitamin A & D Ointment provides vitamins A and D in a pleasant lanolin-petrolatum base that does not stain tissues or bed clothes.

℞ in 1½ oz. or 4 oz. tubes;
1 lb. or 5 lb. jars.



July 12th. After 2 months of treatment with White's Vitamin A & D Ointment, ulcer crater reveals healthy granulation tissue and evidence of beginning epithelial repair.

White's

WHITE LABORATORIES, INC., KENILWORTH, N. J.

IN DIABETES...

greater security against vascular complications

Increased threat of vascular complications in diabetic patients can result from recurring episodes of inadequate control; at such times amino acids are "wasted" by de-amination in the liver and normal dietary security against lipotropic deficiency fades.

TRADE MARK

Gericaps

(Sherman Lipotropic Capsule) **One capsule t.i.d.**

Gericaps contain the true lipotropics, choline and inositol, which are unaffected by de-amination in the liver. Three capsules daily provide the equivalent of 3 Gm. choline dihydrogen citrate.

This dose also provides 60 mg. rutin and 37.5 mg. ascorbic acid to maintain or improve capillary integrity, as well as 3000 units vitamin A, 3 mg. thiamine hydrochloride, 3 mg. riboflavin, 12 mg. niacinamide, 0.75 mg. pyridoxine hydrochloride, and 3 mg. calcium pantothenate.

SEND FOR comprehensive review:
"Prevention of Vascular Complications of Diabetes"

SHERMAN LABORATORIES
BIOLOGICALS • PHARMACEUTICALS
WINDSOR • DETROIT 11, MICH. • LOS ANGELES

to speed defervescence

to speed convalescence

Tetracyn® SF*

Brand of tetracycline

Pfizer-discovered tetracycline fortified with water-soluble vitamins to meet the "stress" demands of fever and infection.

*Trademark for Pfizer brand of antibiotics with vitamins

Pfizer PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N.Y.

Pyridium®

(PHENYLAZO-DIAMINO-PYRIDINE HCl)

Gratifying relief from urinary distress in a matter of minutes

IMPORTANT BENEFITS: Well-tolerated, fast-acting urinary analgesic. Action confined to GU tract. Compatible with sulfas and antibiotics.

FOR COMFORT
ON THE JOB . . . AND AT PLAY

EFFECTIVE—In a clinical report covering 118 cases of pyelonephritis, cystitis, prostatitis and urethritis,[1] PYRIDIUM relieved or abolished pain and burning in 93% of the patients and decreased or eliminated nocturia in 83.7% of the cases.

NONTOXIC—Analgesia from PYRIDIUM is restricted to the urogenital mucosa. Concomitant administration of PYRIDIUM and sulfonamides or antibiotics is often desirable to relieve pain in the interval before the antibacterials can act.

PHYSIOLOGICAL—Through its local analgesic action, PYRIDIUM helps relax the sphincters, thus facilitating emptying of the bladder.

PSYCHOLOGICAL—The characteristic orange-red color of PYRIDIUM in the urine is often an immediate assurance to the patient of prompt action.

SUPPLIED—in 0.1 Gm. (1½ gr.) tablets, vials of 12 and bottles of 50, 500, and 1,000.

PYRIDIUM is the registered trade-mark of Nepera Chemical Co., Inc., for its brand of phenylazo-diamino-pyridine HCl. Sharp & Dohme, Division of Merck & Co., Inc., sole distributor in the United States.

SHARP & DOHME
PHILADELPHIA 1, PA.
DIVISION OF MERCK & CO., INC.

REFERENCE: 1. Kirwin, T. J., Lowsley, O. S., and Menning, J., Am. J. Surg. **62**:330-335, December 1943.

FOR VARICOSE VEINS
FROM BAUER & BLACK

AN ELASTIC STOCKING THAT DOESN'T LOOK LIKE ONE

So sheer, your patients will wear it cheerfully—yet it gives correct, graduated support from ankle to thigh

Now you can prescribe elastic stockings that are truly sheer and inconspicuous. So sheer and dressy-looking, in fact, your patients can wear them without overhose. No patient co-operation problem with *these* stockings.

Yet sheer as they are, Bauer & Black elastic stockings give proper remedial support. They're knitted with rear-fashioning seam so that pressure is adjusted to leg contours, avoiding undesirable constriction. Pressure decreases gradually from ankle up, gently speeding venous flow.

Shouldn't you prescribe Bauer & Black elastic stockings next time? More doctors *do*.

Shaded area indicates correct pressure pattern of Bauer & Black Elastic Stocking.

© 1955 THE KENDALL COMPANY

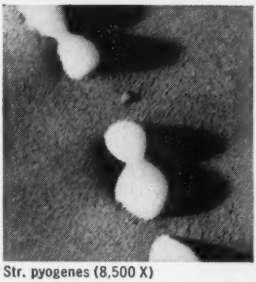
BAUER & BLACK

ELASTIC STOCKINGS

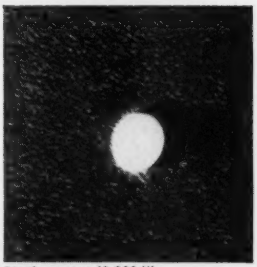
Division of The Kendall Company
309 West Jackson Blvd., Chicago 6, Ill.

The organisms commonly involved in

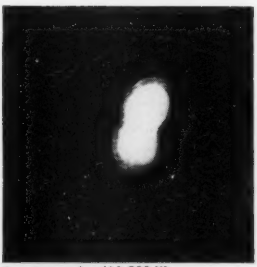
Tracheobronchitis



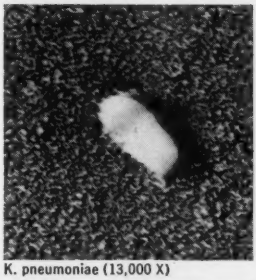
Str. pyogenes (8,500 X)



Staph. aureus (9,000 X)



D. pneumoniae (10,000 X)



K. pneumoniae (13,000 X)

H. influenzae (16,000 X)

H. pertussis (7,500 X)

Upjohn

ELECTRON MICROGRAPHS

***All* of them are included in the more than 30 organisms susceptible to broad-spectrum**

PANMYCIN*

HYDROCHLORIDE

100 mg. and 250 mg. capsules • 125 mg. and 250 mg./tsp. oral suspension (PANMYCIN Readimixed)
100 mg./cc. drops • 100 mg./2 cc. injection, intramuscular
100 mg., 250 mg., and 500 mg. vials, intravenous

*TRADEMARK, REG. U. S. PAT. OFF.—THE UPJOHN BRAND OF TETRACYCLINE

28A

"I can still do a big wash every week and never mind it at all!"

Many a modern grandmother is a fair match for the younger members of her family. To help such persons sustain their activities as they grow older, dietary supplementation may be desirable. GEVRAL provides 14 vitamins, 11 minerals and purified intrinsic factor concentrate in one convenient capsule for geriatric use.

Gevral*

Geriatric Vitamin-Mineral Supplement Lederle

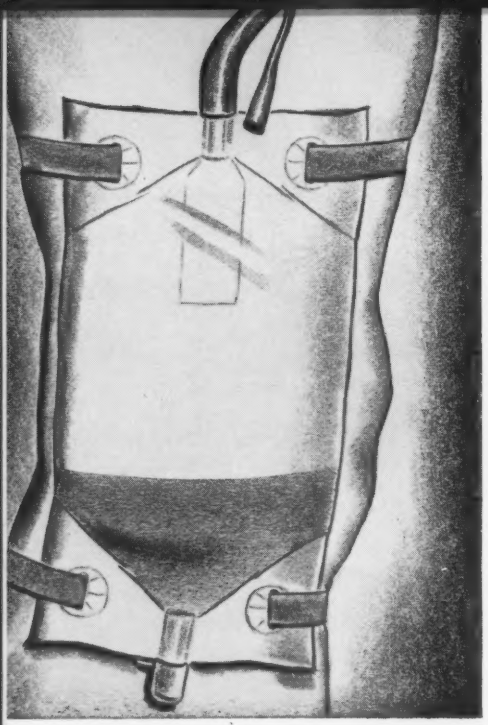
Each GEVRAL capsule contains:

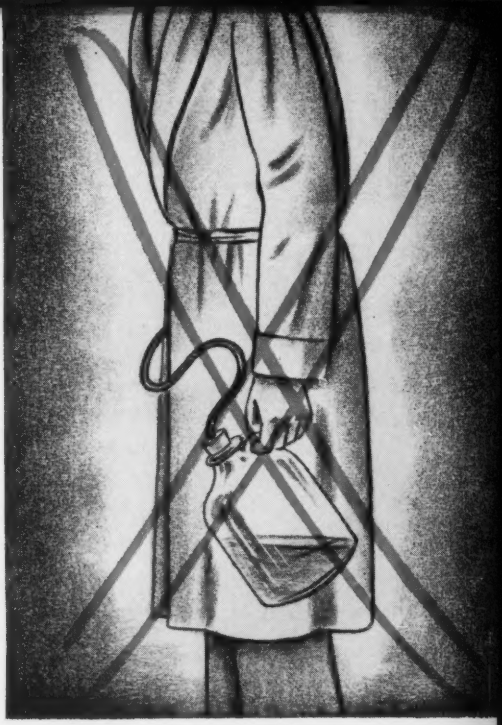
Vitamin A	5000 U.S.P. Units	Choline Dihydrogen Citrate	100 mg.	Calcium (as $CaHPO_4$)	145 mg.
Vitamin D	500 U.S.P. Units	Inositol	50 mg.	Phosphorus (as $CaHPO_4$)	110 mg.
Vitamin B_{12}	1 mcgm.	Ascorbic Acid (C)	50 mg.	Boron (as $Na_2B_4O_7.10H_2O$)	0.1 mg.
Thiamine Mononitrate (B_1)	5 mg.	Vitamin E (as tocopheryl acetates)	10 I. U.	Copper (as CuO)	1 mg.
Riboflavin (B_2)	5 mg.	Rutin	25 mg.	Fluorine (as CaF_2)	0.1 mg.
Niacinamide	15 mg.	Purified Intrinsic Factor Concentrate	0.5 mg.	Manganese (as MnO_2)	1 mg.
Folic Acid	1 mg.	Iron (as $FeSO_4$)	10 mg.	Magnesium (as MgO)	1 mg.
Pyridoxine HCl (B_6)	0.5 mg.	Iodine (as KI)	0.5 mg.	Potassium (as K_2SO_4)	5 mg.
Ca Pantothenate	5 mg.			Zinc (as ZnO)	0.5 mg.

Other Lederle geriatric products include: GEVRABON* Vitamin-Mineral Supplement Liquid with a wine flavor; GEVRAL* Protein Vitamin-Mineral-Protein Supplement Powder; and GEVRINE* Vitamin-Mineral-Hormone Capsules.

*REG. U.S. PAT. OFF.

Lederle LEDERLE LABORATORIES DIVISION AMERICAN Cyanamid COMPANY Pearl River, New York





NEW BARD DISPOZ-A-BAG®

Lightweight Disposable Urine Bag for Use by Ambulant Hospital Patient with Indwelling Catheter Avoids Danger of Ascending Infection

Lightweight plastic leg bag eliminates inconvenient jugs or bottles and offensive odors. Weighs less than 1 ounce. Has adjustable rubber leg straps.

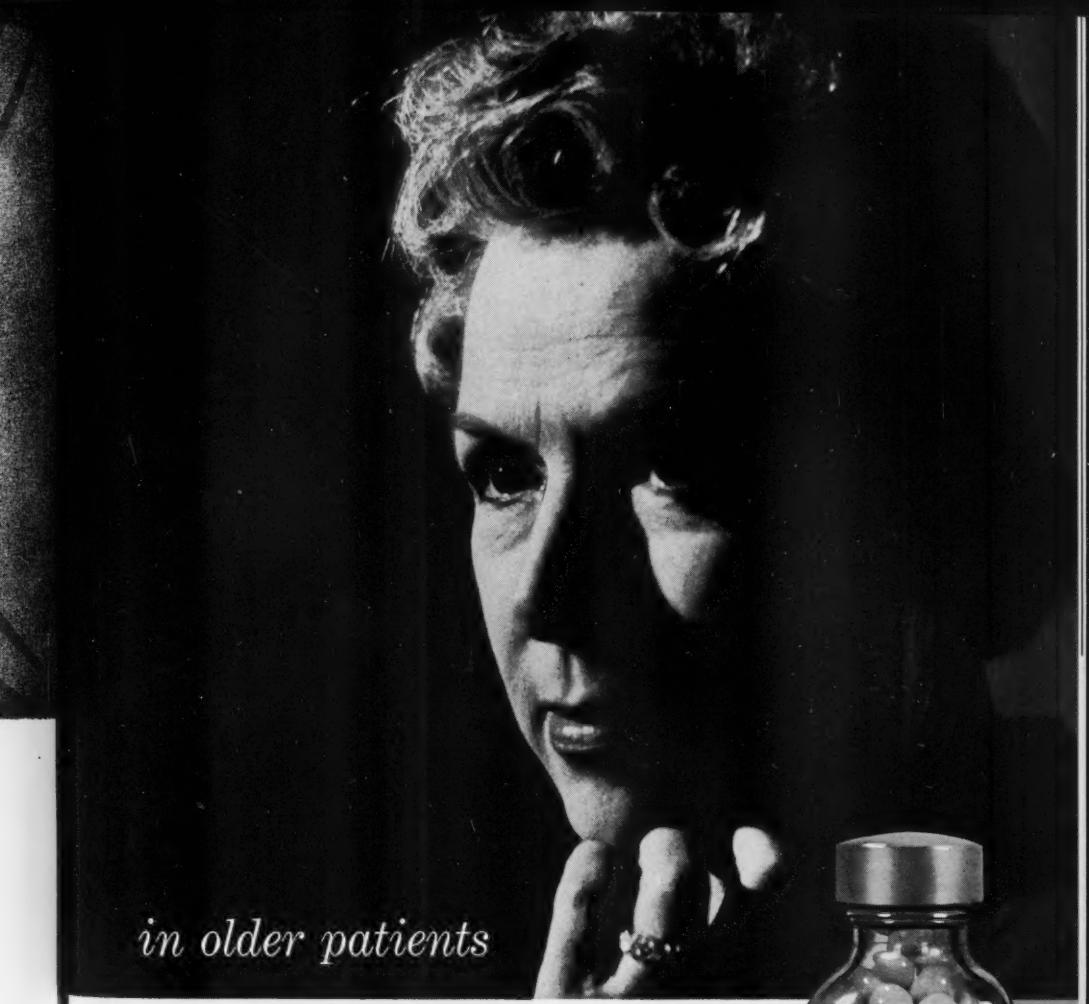
Return flow prevented by flutter valve, even when patient is sitting or reclining. Avoids danger of ascending infection. Easily emptied from bottom outlet.

Comes sterile ready for use, in individual package. Complete with built-in adapters to fit catheters or tubes.

Saves nurses from disagreeable work of emptying urine receptacles and cleaning and deodorizing bottles, connectors and tubing.

Inexpensive and gladly paid for by patient when charged to account. May be worn home by patient or discarded.

C. R. BARD, INC. SUMMIT, NEW JERSEY



rebuild bone—avoid pain, debility, fractures

- promote reconstruction of bone matrix
- stimulate osteoblastic activity
- enhance calcium and phosphorus redeposition

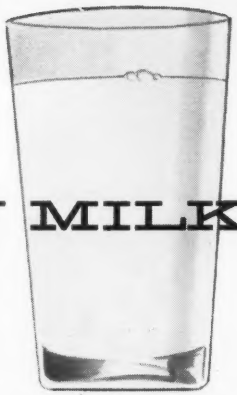
valuable, too, in osteoporosis of menopause, postmenopause, arthritis and long-term ACTH, cortisone, and hydrocortisone therapy.

for individualized therapy: two strengths

GYNETONE® REPETABS® ".02": ethinyl estradiol 0.02 mg. plus 5 mg. Methyltestosterone U.S.P.

GYNETONE REPETABS ".04": ethinyl estradiol 0.04 mg. plus 10 mg. Methyltestosterone U.S.P.

CARNATION INSTANT NONFAT DRY MILK



A new way to specify additional calcium and protein, so frequently deficient in geriatric diets

Nutritional research in geriatrics demonstrates a frequent deficiency in calcium and protein, lending to anemia, fatigue, tissue wastage and osteoporosis. Nonfat milk is useful in a geriatric diet high in calcium and protein, low in fat. Among nonfat milks, new Carnation Instant offers specific advantages:

New Carnation Instant is delicious for drinking—and permits 25% self-enriched nonfat milk

Specifying a single extra tablespoon of Carnation Crystals per glass will provide:

- up to 25% more protein, calcium and B-vitamins than bottled nonfat (or whole) milk, with no increase in liquid bulk.
- a heavier body and richer flavor well-liked by patients who ordinarily resist the unfamiliar "thin" body and flavor of bottled nonfat milk.

Exclusive Carnation Crystal Form WINS TOP 1955 FOOD AWARD

Carnation Instant is nonfat milk in a new *crystal* form—an exclusive process that received the 1955 Food Engineering Award as most significant food improvement of the year. Mixes instantly in ice-cold water. Ready to drink, with fresh milk flavor. No special recipes needed. Costs up to 7¢ less per quart than bottled nonfat milk. Available everywhere.

A NEW COUGH SPECIFIC

Free from central depression

NON-NARCOTIC

Free from addiction

TESTED IN 18,000 OBSERVATIONS*

No constipation

Romilar 'Roche'

a 10-mg dose of Romilar
is equivalent to
a 15-mg dose of codeine
available in tablets
and as a syrup

*L. J. Cass *et al.*, *New England J. Med.*, 249:132, 1953; *Am. J. M. Sc.*, 227:291, 1954.

Romilar® Hydrobromide – brand of
dextromethorphan hydrobromide
(d-3-methoxy-N-methylmorphinan hydrobromide)

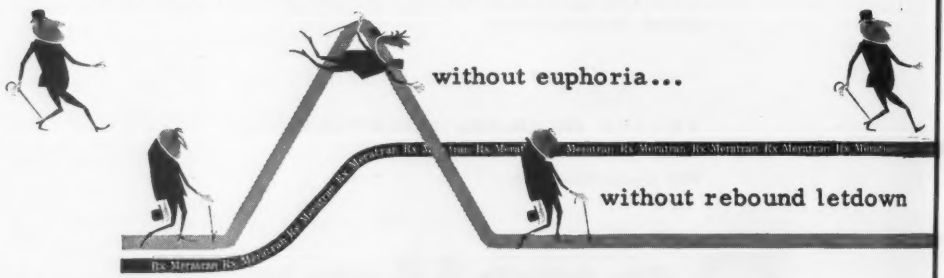
HOFFMANN-LA ROCHE INC
Roche Park • Nutley 10 • New Jersey

NEW DRUG

Meratran

(pipradrol hydrochloride)

a unique central motivant with demonstrated subcortical activity subtly returns your emotionally fatigued and depressed patients to their usual level of alertness, interest and productivity[1-2]...



Meratran's action, in easily adjusted doses, is prompt—subtle – comfortable – Its effectiveness is prolonged.

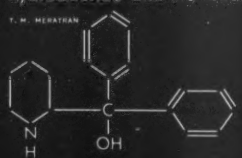
• no appreciable effect on blood pressure and respiration • restores needed sense of well-being • no tolerance or drug habituation • normal appetite undisturbed • no jitters - no apprehension • little or no insomnia • wide range of safety • no rebound letdown

Rx INFORMATION

Meratran

Indications: Emotional fatigue, unhappiness of more common type (financial worry, social stress). Situational stress or *mild* depression. Adjunctive therapy in certain psychoses and psychoneuroses.[3,4]

Composition: alpha-(2-piperidyl) benzhydrol hydrochloride with the following structure:



Dosage: For emotional fatigue and mild depression, *1 to 6 mg. daily. Individual patient response must be observed and daily dosage and duration of administration adjusted to patient response.*

Supplied: Small pink tablets containing: 1 mg. Meratran (pipradrol) hydrochloride.* Bottles of 100.

* Alpha-(2-piperidyl) benzhydrol hydrochloride.

1. Heath, R. C.: Discussion of paper by Howard D. Fabing (alpha-(2-piperidyl) benzhydrol hydrochloride, a new central stimulant in the treatment of blepharospasm, spasmodic torticollis and narcolepsy) presented before the American Neurological Association, Atlantic City, June 14, 1954. 2. Fabing, H. D., Hawkins, J. R., Moulton, J. A. L.: Clinical studies on alpha-(2-piperidyl) benzhydrol hydrochloride, a new antidepressant drug. Presented before the American Psychiatric Association, St. Louis, Missouri, May 3, 1954. 3. Fabing, H. D.: Alpha-(2-piperidyl) benzhydrol hydrochloride, a new central stimulant, in the treatment of blepharospasm, spasmodic torticollis and narcolepsy; preliminary report (Motion Picture Demonstration), American Neurological Association, June 14, 1954. 4. Himwich, H. E.: Discussion of paper (reference 2), American Psychiatric Association, May 3, 1954.

Merrell Since 1828

THE WM. S. MERRELL COMPANY

New York • CINCINNATI • St. Thomas, Ontario

PIONEER IN MEDICINE FOR OVER 125 YEARS

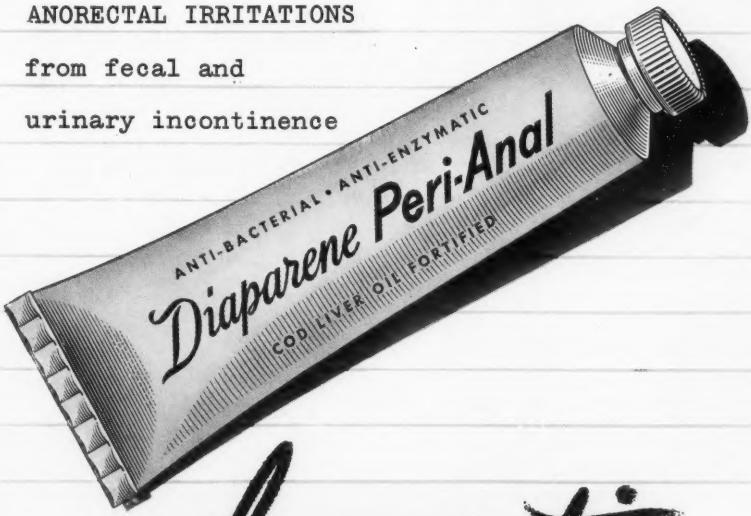
in the treatment of DERMATITIS

around COLOSTOMIES, FISTULAS and

ANORECTAL IRRITATIONS

from fecal and

urinary incontinence

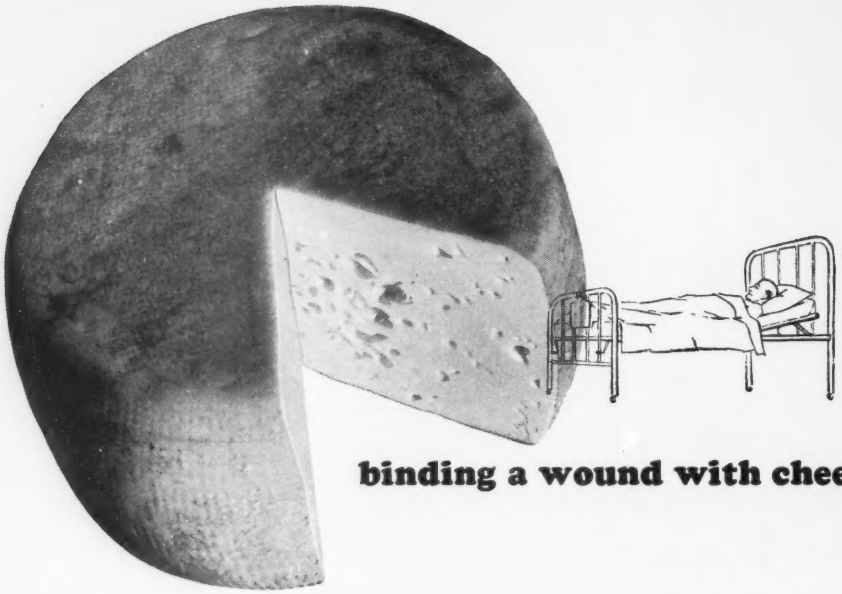


dramatic results!

Well documented!

Supplied in 1 oz. tubes
and 1 lb. jars

Dept. G, PHARMACEUTICAL DIVISION, HOMEMAKERS' PRODUCTS CORPORATION, 380 Second Avenue, New York 10, N. Y.



binding a wound with cheese

A wound is as strong as the connective tissue that holds it together...and the maximum strength of a wound is reached more rapidly when the diet contains liberal amounts of protein for growth of connective tissue.[1]

Cheese, long recognized as an excellent and concentrated source of easily-digested milk protein, simultaneously provides generous amounts of calcium, phosphorus and other nutritionally important minerals and vitamins.

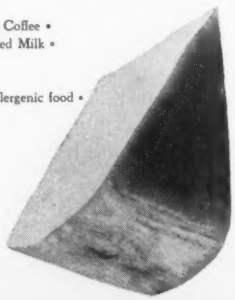
Cheese is likewise indicated for its high protein value in the geriatric diet[2] and whenever low tissue protein stores are suspected, not only in poorly healing wounds but also in patients with bed sores, chronic bullous diseases, atopic dermatitis, and senile pruritus.[3]

The wide variety of Borden cheeses lends itself to a diversified diet—from main dishes based upon popular Cheddar and Swiss or refreshing salads with soft Cottage or Cream cheese—to epicurean Camembert or Liederkranz Brand that add a tangy finish to the meal.

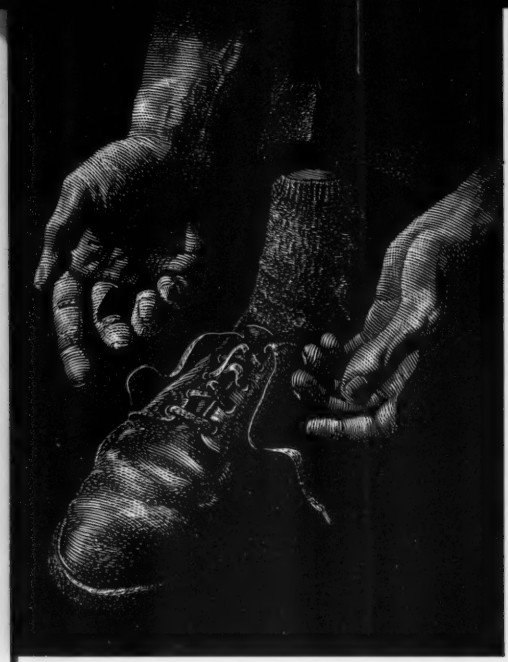
High palatability, pleasing texture and delicious flavor, characteristics of Borden cheeses, stimulate the appetite and contribute to greater eating enjoyment for both the convalescent and other members of the family.

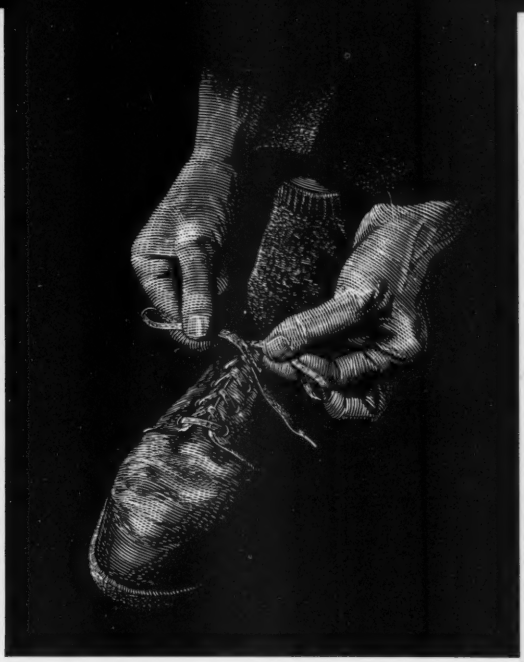
Manufacturers and distributors of BORDEN'S Instant Coffee • STARLAC non-fat dry milk • BORDEN'S Evaporated Milk • Fresh Milk • Ice Cream • Cheese • EAGLE BRAND Sweetened Condensed Milk • BREMIL powdered infant food • MULL-SOY hypoallergenic food • BIOLAC infant food • DRYCO infant food • KLIM powdered whole milk

1. Baborka, C. J.: Treatment by Diet, ed. 5, Philadelphia, J.B. Lippincott Company, 1948, p. 607.
2. Sebrell, W. H., in Stieglitz, E. J.: Geriatric Medicine, ed. 2, Philadelphia, W. B. Saunders Company, 1949, p. 194.
3. Morgan, D. B.: J. Missouri M. A. 49:896 (Nov.) 1952.



The Borden Company
350 Madison Avenue, New York 17, N. Y.





from futility to utility... in rheumatoid disorders

Acetycol provides welcome relief to the patient suffering from the stiffness and pain of arthritis and related rheumatoid disorders. With Acetycol therapy his range of pain-free mobility is broadened and his entire outlook brightens. He is able again to resume more normal activities in work and play.

The effectiveness of Acetycol is based on synergism between aspirin and para-aminobenzoic acid. These two agents in combination achieve high salicylate blood levels on relatively low dosage. The addition of salicylated colchicine extends the effectiveness of Acetycol to cases of a gouty nature.

Acetycol also contains three important vitamins often lacking in older and rheumatic patients: these are ascorbic acid, to prevent degenerative changes in connective tissues; thiamine and niacin, for carbohydrate utilization and relief of joint pain and edema.

Usual dosage—1 or 2 tablets three or four times a day.

Each Acetycol tablet contains:

Aspirin	325.0 mg.
Para-aminobenzoic acid	162.0 mg.
Colchicine, salicylated	0.25 mg.
Ascorbic acid	20.0 mg.
Thiamine hydrochloride	5.0 mg.
Niacin	15.0 mg.

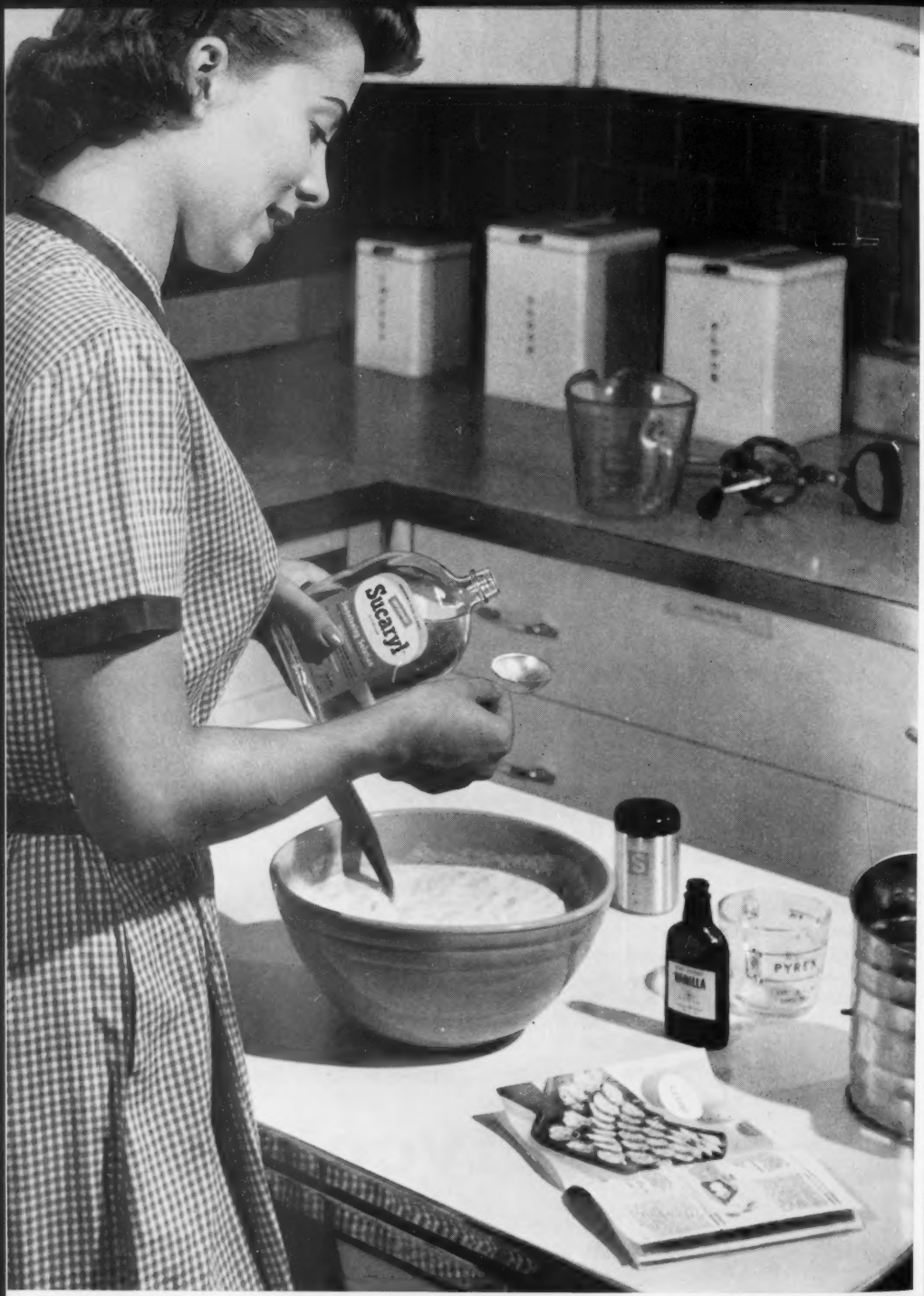
Supplied: Bottles of 100 and 500.

Acetycol

TRADEMARK

to relieve rheumatic pain

WARNER-CHILCOTT



SWEETEN TO ANY TASTE. With new Improved SUCARYL, you can sweeten to levels never before possible with a non-caloric sweetener. That's because the "off taste" threshold in Improved SUCARYL has been pushed back far beyond the level of all known artificial sweeteners.

WHAT'S THE STORY ON IMPROVED SUCARYL®?

MORE VARIETY IN DISHES. Improved SUCARYL opens up a whole new world of fully sweetened foods for controlled diets—makes possible an almost unlimited variety of dishes. Cooking and menu planning are made easier!

TASTES BETTER THAN EVER. Here's a new, wholly natural sweetness—with complete freedom from bitterness or aftertaste in ordinary use. *And that applies even to persons with highly sensitive tastes.*

BRAND NEW RECIPE BOOKLET
It's waiting for you at the nearest drug store. Pick up a copy today—or drop us a note.

TABLETS, LIQUID, POWDER • CALCIUM FORMS FOR LOW-SALT DIETS

ABBOTT LABORATORIES / NORTH CHICAGO, ILLINOIS

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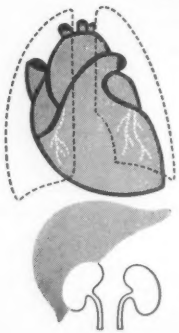
does your diuretic cause acidosis?

know your diuretic



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Geriatrics Volume 10, Number 10

Preparing the geriatric patient for surgery

JOHN R. IBBERSON, M.D.
CALGARY, CANADA

The general practitioner, working as the advance guard of the surgical team, can and must accept most of the responsibility for the preparation of the geriatric patient for surgery. His examination, assessment, and technical preparation must develop a solid foundation to support good surgical treatment, if good patient response and good technical results are to be achieved.

◆ Because elderly people have had time and opportunity to develop one hundred and one individual variations of the standard foibles and phobias, they present a special challenge to both general practitioner and surgeon. What might be excellent procedure in one case may be of little use or actually harmful in another.

This is the background against which I would like to sketch what I consider to be the important features of preparing the geriatric patient for surgery. We shall limit our subject to elective surgery, viewing the problem as a general practitioner working with a consultant surgeon. To some extent this puts an emphasis on surgery of the gastrointestinal and genitourinary systems.

The Decision to Operate

Before initiating preparation in any geriatric patient we must ask ourselves honestly, "Does this patient need an operation? To what extent will he or she be better after surgery?" Elderly patients seek a doctor's guidance as well as diagnosis. A characteristic example is the elderly patient with a poorly functioning gallbladder, complaining of dyspepsia after ingestion of certain foods. Surgery will probably not cure the dyspepsia, but a frank explanation will allow the patient to understand, and live with the problem. Many elderly patients are more willing to accept this approach than we sometimes imagine. In some cases, it is more prudent to accept less than perfect function than to constantly press forward, to satisfy our technical desires.

JOHN RAWCLIFFE IBBERSON *is engaged in general practice in Calgary, Alberta; is on the staffs of Holy Cross and Calgary General Hospitals.*

When stone and colic are superimposed in the elderly patient, we should present the results of our technical findings in such a way that the patient can be assisted in reaching his own decision. The patient with a history of infrequent colic should be given the findings, alternative procedures, and prognosis, and then allowed the privilege of reaching his own decision. We must not be guilty of talking patients into operations in the absence of sound medical reasoning and good judgment. Our responsibility is guidance as well as diagnosis.

Even in cases in which a choice does not exist and surgery is mandatory, the best results are dependent upon the patient's acceptance of the surgical procedure. A fastidious woman, for example, cannot easily accept the idea of a colostomy and the necessity of handling bowel contents. If we explain that her life is dependent upon this procedure, her outlook and attitude become more cooperative.

Assessment of Patient

After we have made a decision about surgery, our second decision is one of assessment. A general practitioner who has known the patient can probably give the most accurate assessment if he approaches the problem in a logical, organized manner.

ASSESSMENT OF AGE

The patient's tissue age frequently fails to correspond with the chronologic age; yet we are working with tissues, their response, their regenerative powers, and resistance to surgical trauma. The history should clearly state whether a patient appears younger or older than stated age and whether his tissues heal rapidly or slowly. When possible, an estimation of pain threshold and tolerance of analgesics is most helpful in planning pre- and postoperative orders and anesthetic procedures.

ASSESSMENT OF ACTIVITIES

We should specifically inquire about the effect of a patient's physical activities. This is still the most practical assessment of cardiovascular, muscular, and pulmonary function. What can the patient do and how does it affect him? Obviously a patient with a good exercise tolerance is a much safer risk than one who has angina on slight effort, or one who has had a slight stroke.

How well does this patient function during and after muscular exercise? This should give us some estimate of coordination and general physiology.

ASSESSMENT OF TISSUE FUNCTION

The past medical history must be assessed. The functional inquiry should be elicited, keeping in mind the past and present function of the tissues in each system. Are there incipient signs of tissue failure in any of the basic systems? Has near mortal damage occurred from previous disease? Nature originally provided an excess of functioning tissues, so that most systems had a reserve above and beyond normal requirements. Some geriatric patients have drawn on the reserve in certain systems to the point of incipient failure. We must detect this preoperatively and assess degree of damage. When possible, supportive measures must be initiated preoperatively.

We must weigh the decision concerning our surgical procedure against the assessment of tissue function. In order to do this the general practitioner must have an accurate working knowledge of the stress and strain involved in major surgical procedures. This is particularly applicable when dealing with cancer patients. Cancer operations are extensive and as such are shocking. The general practitioner can obtain this knowledge by working as an integral part of the surgical team. He can and will take his rightful place in this team if he is willing to accept and discharge his full respon-

sibility, a large proportion of which occurs in the preparation and assessment of the patient. The surgeon, who sees the patient only once or twice before the operation, cannot hope to assess the patient as accurately as a conscientious general practitioner with a broad medical knowledge concerning that patient.

The manner in which a patient answers questions in the functional inquiry may give a rough estimate of the degree of senility. This is a difficult appraisal in new patients, sometimes better carried out by relatives or the nursing staff. When patients are hesitant and groping in their replies or when they have great difficulty in recalling dates, some estimate of cerebral function can be obtained by using the 100 minus 7 test. We usually tell the patients we wish to check on their figuring ability and ask them to subtract 7 from 100 and continue subtracting 7 from each answer. Anyone with a fourth-grade education should be able to handle such a problem. The rapidity, and to some extent the accuracy, of their answers is of little account. The importance of the test is the way the patient reacts to it. When cerebral reserve is limited, the patient will become confused and will be unable to handle the problem at all. Such a patient requires further investigation before being submitted to the trauma of surgery.

ASSESSMENT OF PATIENT AS A PERSON

Unfortunately, under stress and strain of a busy practice, we sometimes forget the patient as a person! The general practitioner has a duty to the patient and surgeon to assess his patient as a person; particularly when choice of operative procedure is available. Some patients have the intelligence to tolerate certain procedures—skin ureterostomies, for example. Some can be relied upon when follow-up care is necessary, but others will not bother. We must place ourselves in the patient's position, appraise this in the light of our medical knowledge, and then chart our course of action in consultation with the surgeon.

ASSESSMENT OF CONFIDENCE

Presumably, the patient has confidence in the general practitioner, for otherwise he would not be following his advice. The general practitioner and surgeon can and should function as a team long before the patient is booked in the operating room. It is most important that the general practitioner assist in developing the patient's confidence in the surgeon and this logically starts with the initial consultation. General practitioners, in most cases, should initiate consultations, not patients who are dissatisfied.

Both surgeon and general practitioner have a responsibility to talk to the patient and explain the medical situation at present and in the future. Many of us are guilty of bypassing this responsibility and yet to the patient it is one of the most important steps in alleviating his anxiety. Investigative procedures may be routine to us—or at least until we have undergone such investigation ourselves—but they are by no means routine to the patient. For instance, it can be explained to him that he will have *temporary* dysuria after a cystoscopic examination.

The general practitioner must prepare the patient mentally and must relieve anxiety by explanation, by reexplanation, and by reassurance. The patient who is frightened or scared to death because of ignorance or lack of explanation is a poor risk. The patient who has lost the will to live, or the mental vigor to convalesce, is a potential mortality. We all know this from experience even though we cannot scientifically measure it. Faith and confidence are potent allies. We must seek them preoperatively.

There are some geriatric patients who for various reasons, usually because of some type of brain damage, are unable

to make their own decisions. We must handle the decision for these patients through the family or a third person. This requires the utmost patience and tact. Our explanations become distorted by passing through many hands, and we become impatient and frustrated. We must seek the most responsible person—it may be a daughter-in-law who is a nurse, or someone with a medical background—and carry our explanations to the family through this person. This is one of the most difficult types of patient to handle.

Technical Preparation

The third decision is one of technical preparation. The easiest way to cover such a situation thoroughly is to think in a logical, step-by-step fashion according to a preconceived plan. This will help to eliminate these annoying oversights which cause embarrassment with confreres and momentary set backs in preparation.

COMPLETE HISTORY

The history should be taken and recorded carefully, as has already been outlined.

COMPLETE PHYSICAL EXAMINATION

We shall not labor all the points in detail, but place emphasis on specific sites and types of examination.

Head and Neck

This includes examination of fundi, visualization of blood vessels, tissue color, and estimation of the degree of arteriosclerosis. The *tongue* is examined for color, state of hydration, and nutrition.

Pulmonary System

Miniature admission chest films, a routine in many hospitals, give a rough, quick estimate, particularly when normal. It is important to estimate the degree of pulmonary fibrosis. Is this patient an old asthmatic or bronchitic? What degree of emphysema is present? Is he a candidate for postoperative pneumonia? How much does he cough? What are his chances of disrupting his wound postoperatively, and what can we do about it preoperatively? It is our duty to warn our confreres about the typical patient with wet, juicy chest.

Cardiovascular System

What is the cardiac size? Since miniature chest films are obtained by using a comparatively long exposure, the cardiac shadow is blurred, tending to make it err on the large size. When in doubt, conventional posterior-anterior and lateral chest films should be obtained for appraisal of pulmonary and cardiovascular systems.

Does this myocardium function well as a pump? Are the beats regular as to rate and intensity? If this muscle is not doing its job adequately, what can we do about it? What is the condition of the blood vessels, keeping in mind the anticipated procedure?

What is the status of the blood volume? This is coming to the fore because of its great importance, particularly in elderly people. It is not unusual to find a relatively normal red blood count and hemoglobin count in an elderly person in the face of a severe deficiency in blood volume. Unfortunately, slight loss of blood may throw these people into acute shock, because they lack the margin of safety granted by a normal blood volume. It is a matter of *quantity* as well as *quality*. Unfortunately, synthetic blood volume expanders can give only palliative results at best, and the hemopoietic system is unable to rapidly correct a sudden loss of blood volume.

Beware particularly the patient who has lost considerable weight. These patients are bordering on shock because their blood volume has gradually decreased with loss of weight, but the extent of their vascular bed remains unchanged. A loss of 300 to 500 cc. of

blood may put these patients in shock because the small quantity of blood remaining becomes lost in the vascular bed, which now is too large for the total amount of blood. These patients should be given transfusions preoperatively and care taken not to suddenly overload their circulatory systems. A suggested rule of thumb, when blood volume estimates are unavailable, is to allow 50 cc. of blood for each pound of weight lost. This is only an approximation.

Gastrointestinal System

Elderly patients, particularly candidates for gastrointestinal and genitourinary surgery, are often nutritional derelicts. They have eaten poorly for some time before seeking medical advice, and, as a result, often present a picture of protein and vitamin deficiency. Under the guidance of a general practitioner, many patients can correct their nutritional deficiencies prior to admission. This should, in the main, be an office procedure. The "tea and toast" diet is more of a reality than we sometimes realize. The obvious clue is not found in the history, but usually in uncomfortable dentures or lack of dentures. Vitamin B complex and vitamin C are of maximum assistance when taken daily during the period before surgery and continued postoperatively.

Estimates of the degree of constant albuminuria or albumin-globulin may give some warning of protein deficiency ahead of time. However, this cannot be corrected adequately by the intravenous route during the immediate preoperative period. Since protein deficiency is difficult to repair in a few short days, it must be discovered and corrected preoperatively.

Gastric suction, postural drainage, bowel sterilization, and bladder drainage are all of inestimable value in preparation for surgery. We learn how great a value only when we become careless or hurried and try to bypass the step-by-step procedures which create a solid foundation for surgical success.

Fluid Balance

The minimum daily adult requirement of fluid is about 2000 cc. The loss is made up of moisture in respiration, 600 cc.; perspiration, 400 cc., with the two totaling 1000 cc.; urine, 800 cc.; and stool, 200 cc. There is approximately 1200 cc. of fluid daily—respiration, perspiration, and stool—which is never shown on the fluid balance sheet, but must always be considered in our daily reckoning. Should the quantity of fluid lost from other sources be increased, or should the kidneys not function at peak concentration efficiency, then 2000 cc. is not sufficient for daily requirements. To repeat, 2000 cc. is the absolute minimum if all systems are working perfectly and there is no added loss of fluid through gastric suction, profuse perspiration, diarrhea, and so on. When this occurs it must be replaced. The body's fluid ledger is accurate, and today's deficits are carried forward until replaced. Accurate fluid intake and output balance sheets are an absolute necessity for proper fluid balance and must be consulted before calculating orders for intravenous fluids.

Genitourinary System

Urinalysis preoperatively has become routine—to the extent that we sometimes fail to deduce all the information that is available.

If the urinalysis is normal and of a high specific gravity, we have notification that renal function is probably adequate. If abnormal, further studies such as nonprotein nitrogen, blood urea, and creatinine tests, are imperative. If the residual urine is scant or nil, there is probably little or no potential vesicle neck obstruction. When genitourinary surgery is anticipated, a routine intravenous pyelogram is frequently used as a scout of bilateral renal function.

Controlled diabetic patients are han-

dled with a minimum of disruption whenever possible. If the type of surgery and anesthetic allows, try to fit the operative time to the patient's diabetic schedule. For example, prostatic resection patients have breakfast, have low spinal anesthetic and surgery at 10:00 or 11:00 o'clock, and return to the ward for a light lunch by 1:00 p.m. However, this is not always possible, particularly with a general anesthetic. In these instances, we usually give sufficient insulin with each intravenous feeding to cover the administered carbohydrate. In other words, each bottle of intravenous glucose contains sufficient insulin to allow its metabolism. As soon as possible these patients are restored to their regular diet and usual type of insulin routine.

Central Nervous System

In our neurologic examination we must search for any mild changes which suggest the possibility of an earlier stroke, even though the history is negative. We must ask ourselves, "What will happen to this patient's central nervous system, with its blood supply precarious because of arteriosclerosis, if the blood pressure falls for any length of time during surgery? How can we prevent this?"

We must be ready to recognize early personality changes. We must be constantly alert for subdural hematoma, the great neurologic imitator, and for early or incipient cerebral thromboses.

Sedation

The thoughtful choice of proper preoperative sedation, tailored to the individual patient's needs and tolerances, does much to expedite successful surgery.

The least confusing drugs seem to be chloral hydrate, Demerol, and paraldehyde. The latter, however, has an odoriferous disadvantage, particularly in wards. In my experience, drugs such as hyoscine, morphine, and the barbiturates are inclined to cause confusion and depression in elderly patients, possibly due to hypotension. Many older patients become disoriented; they think they are at home and, in trying to get out of a high hospital bed, fall and often injure themselves.

Discussion

Elderly people require several days to adjust to new surroundings and new routines. Several days preoperative hospitalization may seem unnecessary, but it has been shown, in our experience, to decrease postoperative hospital days.

Elderly people have the privilege of idiosyncrasies. The nursing staff, who see these people for twenty-four hours a day in comparison to our hasty visits, must learn of these idiosyncrasies preoperatively if they are to help us. We must have a base line established ahead of time if we are to correctly interpret any additional personality changes after surgery. Otherwise, we cannot gauge what was before and what came after. We are sometimes guilty of not paying sufficient attention to the nurses' notes, nor to what they say. Our cursory "How are you?" to the patient may receive a quick, affirmative reply, yet the patient may be completely disoriented. More care must be given to talking with each patient and with the nurse, who probably has had many conversations with the patient before our daily visit.

In planning preoperative care, we must also consider care after discharge. We must send the patient home to persons who know what to expect and how to care for that patient. The elderly person living alone in a single room, cooking his own meals, presents a different problem postoperatively from the patient who can obtain complete home care.

Rehabilitation of the patient with arterial disease of the limbs

K. HARPUDER, M.D.
NEW YORK CITY, NEW YORK

Rehabilitation of the patient with peripheral arterial disease may include psychiatric care, physical care and training of the amputee, and adjustment of the patient and his family to a new and restricted way of life. Each type of arterial disease—Raynaud's syndrome, thromboangiitis obliterans, and obstructive arteriosclerosis—requires a totally different program of rehabilitation.

◆ The three types of peripheral arterial disease in which patients frequently offer a rehabilitation problem are Raynaud's syndrome, thromboangiitis obliterans, and obstructive arteriosclerosis. Rehabilitation differs in each because the damage produced by the disease is different and because the personality of the patient varies characteristically in each one.

Raynaud's Syndrome

Raynaud's syndrome, a spasm of the digital arteries which occurs upon exposure to cold and upon emotional stimuli, involves younger people and predominantly women. In my own experience, the number of men patients has increased since the last World War. The emotional factor varies from predominant to minimal. Although the pain and disfiguration may be momentarily disabling and attacks may occur upon slight provocation, ulcers and other severe trophic changes are rare and generally limited in extent. Healing of ulcers is slow. The fingers are involved more often than the toes. Many of the patients are tense, anxious persons who do not talk readily about their difficulties.

Measures of rehabilitation are usually fused or identical with some of the conservative means of definitive treatment. Psychiatric care has been found useful or even curative in some instances. Prophylactic and protective measures are of greatest importance. Detailed instructions on exposure to cold are easily given although not always easily carried out. In the search for noxious emotional influences, the patient and his home and work environment should be studied carefully by the social service worker and psychologist, and sometimes the psychiatrist. If the patient's work involves exposure to cold or emotional trauma, job transfer and the services of a vocational counsellor may be necessary. Most of these patients are intelligent and young and adjustment to a new job should be easy. However, resistance to change is often considerable. A grocery clerk may never mention that she spends some time each day taking inventory in a cold storage room because she does not want to give up her position. Sometimes moving to a place with a favorable climate, such as Florida or California, or separation from a noxious environment has to be advised.

Although, in Raynaud's syndrome, loss of digits is rare, scleroderma-like

KARL HARPUDER *is assistant clinical professor of medicine at Columbia University College of Physicians and Surgeons.*

skin changes, limitation of motion, flexion contractures of fingers, and scar formation with impairment of sensation occur in severe cases. The resulting disability may be serious, especially if the damage is bilateral. Systematic range-of-motion exercises, facilitated by heat applications or part bath, must be applied at the first sign of trophic skin changes.

Buerger's Disease

The patient with Buerger's disease—thromboangiitis obliterans—lives with an entirely different disease in an entirely different world. This disease is a noninfectious, probably hyperergic, reactive inflammation of large arteries and veins of the extremities and rarely of the viscera. It produces arterial thrombosis, followed by ischemia, ulceration, and gangrene of toes, part of a foot, or rarely a finger. The bordering surviving tissue often shows violent, cellulitis-like reactions. Migratory phlebitis, usually superficial, is common and may incapacitate the patient repeatedly for weeks. Involvement of deep or main arteries leads to ischemia in muscles with the symptom of intermittent claudication. Unless it is halted by proper measures, the disease process is progressive, either continuing for years or in attacks lasting for many months with incomplete remissions. The end results are usually major amputations. The extreme of mutilation is a double above-the-knee amputation with loss of several fingers on each hand.

A cripple so disabled uses his remaining fingers most eagerly to smoke cigarettes. Some of the patients with thromboangiitis will confess smoking and many will deny it. There was a saying among syphilologists, *omnis syphiliticus mendax*, which may be directly transferred to the carrier of Buerger's disease. The disease occurs almost without exception in smokers and it is assumed that it is due to a vascular sensitivity to tobacco proteins. It appears in young men of every race and skin pigment. It is rare in women smokers although it is seen more frequently in recent years.

The patient with Buerger's disease not only smokes but is in many cases addicted to it. He may be unable to stop even when the danger of tobacco is explained to him, when he sees evidence of progressive damage in himself, or when he is confronted with examples of disaster in others. The cripple in a wheelchair will hand over a hidden pack of cigarettes upon urgent appeal and will be seen with a carton a half-hour later.

Many of these patients are emotionally unstable, overreact to pain, and are therefore susceptible to narcotic addiction. They succumb as completely as to tobacco addiction. Their excessive responses to pain, emotional trauma, or even to stresses of daily life result in powerful sympathetic activity. A foot or hand which is warm and of good color, and which has easily palpable pulses, turns bluish, pale, and cold and perspires upon the asking of an unwelcome question. The readiness to vasoconstriction adds to the ischemia of the diseased limbs. An easily professed conviction of the hopelessness of the disease is used as an excuse for addiction, emotional outbursts, and rejection of steady work and family responsibilities. Dexterity and intelligence are usually not impaired.

This gloomy picture is that of the patient with progressive mutilating disease. He is the one who needs rehabilitation. Those who stop smoking early and before serious damage occurs, generally return easily and unaided to work and normal family life.

The rehabilitation program in Buerger's disease includes psychiatric care, physical rehabilitation in absence of major amputation, care of the amputee, adjustment to and of the home environment, and adjustment to work.

PSYCHIATRIC CARE

Psychiatric care belongs to the sphere of definitive treatment as well as to reha-

bilitation. Repeated studies of addiction to tobacco have yielded explanations of a self-destructive tendency or of Freudian complexes, but attempts to resolve the addiction were generally not successful. Psychiatric help may be essential for other emotional problems and for guidance of vocational counsellor and social service worker.

PHYSICAL REHABILITATION

Physical rehabilitation should start simultaneously with definitive therapy. This is especially important in presence of severe trophic lesions requiring bed rest. Painful lesions on a foot or toe produce withdrawal reflexes and result in flexion contracture of knee and sometimes hip. Knee, hip, and Achilles tendon of the involved extremity must be stretched several times daily and resistive exercises to noninvolved limbs must be practiced. The latter may help maintain a normal metabolism at bed rest and avoid deep vein thrombosis. Care of fungous infections and meticulous foot hygiene should be taught at this time in order to prevent unnecessary damage and facilitate the patient's later reactivation. It is then possible for younger patients to resume walking and complete physical independence without great difficulty.

CARE OF THE AMPUTEE

The amputee needs the usual stump care. He should start to walk on a pylon before his prosthesis is ready and as soon as the stump is healed. Phantom pain is rare. Walking on a midleg prosthesis is easy and even a high artificial limb usually offers no serious problem. We have seen a man with bilateral below-knee amputations walk off on one prosthesis and crutches on first attempt.

When the patient leaves the hospital he must have well-fitting shoes, especially after a transmetatarsal amputation. Orthopedic anomalies of the foot should be considered. Nail care must be expert and nontraumatic for the slightest foot injury may lead to a catastrophe. Walking should be encouraged with brief rest periods whenever intermittent claudication appears. Since exposure to cold is detrimental, patients must be instructed as to necessary protective clothing. Patients should not swim except in pools, for intermittent claudication increases in cold water and may be fatal.

ADJUSTMENT TO HOME AND JOB

Physical adjustments in the home are necessary only if the patient with minimal walking ability or the patient with an above-the-knee prosthesis has to climb stairs. Expert psychologic or psychiatric advice is often needed for both patient and family to eliminate emotional trauma or, conversely, overprotection. The problem of tobacco addiction should be understood by the family. The physically handicapped and emotionally unstable patient often needs a change in occupation or in the location of his job He is a poor candidate for steady work and needs much advice and encouragement. In job counselling, questions of transportation, exposure to cold, exposure to minor trauma on hands or feet, and inducement to smoking also should be considered.

It is evident that the rehabilitation in a case of severe Buerger's disease requires the synergistic action of a team of experts upon both patient and environment to achieve even temporary and limited success. Mild arrested cases return spontaneously to a normal life.

Obstructive Arteriosclerosis

Although patients with arteriosclerosis obliterans suffer, as do those with Buerger's disease, from ischemia of the limbs with intermittent claudication and gangrene, they present quite a different total picture and rehabilitation problem. Obstructive arteriosclerosis is a degener-

ative process of main, large, and small arteries leading to thrombosis and vascular occlusion. The cause is unknown despite recent experimentation and hypotheses. It commonly involves visceral blood vessels, and especially coronary and cerebral vessels, in conjunction with the limb arteries. It is often combined with hypertension. It appears clinically most often in the higher age groups and in the younger diabetic whose disease is of long standing, with much vascular and neurologic deterioration. There is only slight male preponderance.

Occlusion may develop insidiously or rapidly; it may be segmental in an iliac artery or extend from that site throughout the arterial tree of the limb. It may involve the small branches and leave no circulatory reserve or collateral supply. The patient may suffer for years with only a nonprogressive intermittent claudication, skin atrophy, and coldness of the foot, or his walking ability may rapidly diminish to a few steps. He may have severe pain at rest due to ischemic neuropathy or impending gangrene. Indolent, nonhealing ulcers without a definite inflammatory response develop on a cold, pale, cyanotic toe or foot. Gangrene may be limited to the tip of a toe or progress to the whole foot.

Prior to manifestations of vascular disease, nondiabetics are within the ranges of the average population in behavior, working ability, and family relations. With the clinical appearance of arteriosclerosis, there is often some mental and emotional deterioration from cerebral vascular changes without localizing damage. Coronary artery disease, heart failure, and hypertension may further undermine the patient's physical status and personality. Fear of "hardening of the arteries" and of gangrene as seen in relatives, and iatrogenic concern about blood pressure and heart attacks may demoralize him. In the diabetic, neuropathies, tendency to infections, and kidney disease frequently add to the disability of arteriosclerotic vascular disease.

Rehabilitation is needed chiefly in the advanced cases with ulcers and gangrene. Demarcation and healing are extremely slow and bed rest or semi-bed rest may extend over many months. Endurance and agility diminish further from the long inactivity. The patient has to face the possibilities of chronic disease and permanent unemployability because of disability and age.

PREVENTIVE MEASURES

Prevention of avoidable damage is the most vital part of the physical program during inactivity. Measures should be taken to protect the heel against pressure and the toes against maceration, and to prevent flexion contracture in knee and hip. Assisted active and passive exercises of the lower extremities may aid in preventing phlebothrombosis. General conditioning exercises and bedside or wheelchair occupational therapy reduce the physical and emotional damage of inactivity. The social service worker should prepare the patient and his family for acceptance of and adjustment to his disability.

EDUCATION OF AMBULATORY PATIENT AND AMPUTEE

When the patient is ready for ambulation and discharge from hospital, he must be taught skin and nail care. Attention to shoes is necessary. Walking must be prescribed in dosages like medication. The patient and his family must be warned against exposure to cold and, more important, against heat application to the ischemic foot.

If the elderly arteriosclerotic had an amputation, early stump care and prophylactic care of the alternate limb must be instituted. Suction limbs are not advisable. Most patients with a below-the-knee amputation learn to walk well with a cane, but progress is often slow with a

thigh amputation. Two canes or low crutches may have to be retained. Bilateral thigh amputees remain in the wheelchair. Double midleg amputees may learn to walk limited distances. In the training of these patients, their low endurance and diminished cardiac reserve often need attention.

In the diabetic, vascular disease of the lower extremities is often combined with peripheral neuropathy. There is sensory loss and weakness, most often of the foot extensors. Because of sensory loss the foot is especially susceptible to trauma. The most detailed instructions in prevention and protection must be impressed upon patient and family. The weakness may respond to resistive exercises or may require bracing. The diabetic of long standing frequently has deformities of the foot, which are as characteristic as Kimmelstiel-Wilson disease—atrophic intrinsic muscles, atrophic skin, protruding metatarsal heads with exostosis, and hammer toes. In weight bearing, pressure points appear over metatarsals and the dorsum of the toes, resulting in severe pain, callus formation, and so-called trophic ulcers. Patients with these conditions are seriously disabled and need metatarsal bars or specially built insoles in their shoes. In advanced cases, the deformities may be a good reason for amputation.

In many instances, intermittent claudication, tendency to trophic lesions, or even rest pain are permanent and seriously disable the patient. If there is further physical impairment from coronary artery disease or mental deterioration from cerebral vascular disease, a return to employment cannot be expected. The only realistic goal of rehabilitation is to make the patient independent of help at home. Even without these complications, the patient may be unfit for his original work and unfit for retraining. Even if the vocational counsellor can find a suitable occupation, such as sitting work indoors, and transportation is available, placement remains difficult. The social service worker must then help the patient to adjust to the reality of semi-invalidism, make him useful to his family in his own home, and perhaps establish contact with community clubs to help him occupy some of his excess time. Stair walking is difficult and may require relocation of the patient's home.

An encouraging feature of treatment is that a number of arteriosclerotics have mild stationary impairment of the peripheral circulation and others improve as collateral circulation develops. These persons maintain a fairly normal life or return to it without difficulty or need for special aid.

> Long ago I learned from my father to put old people to bed only for as short a time as was absolutely necessary, for they were like a foundered horse, if they got down it was difficult for them to get up, and their strength ebbed away very rapidly while in bed.
>
> CHARLES H. MAYO

Palliative surgery in carcinoma of the pancreas

WILLIAM S. GLASSMAN, M.D., and
PAUL W. JOHNSTON, M.D.
LONG BEACH, CALIFORNIA

The frequent occurrence of duodenal obstruction in patients with carcinoma of the pancreas indicates that gastroenterostomy should be performed routinely with cholecystojejunostomy for palliation of this disease. The patient is afforded maximum comfort by this method of anticipating obstruction from duodenal involvement. An end-to-side cholecystojejunostomy and an anticolic gastrojejunostomy are used.

◆ The objective of surgery in most cases of carcinoma of the pancreas is palliation. At the time of operation the tumor has usually grown beyond the confines of en bloc dissection or involves vital structures which cannot be sacrificed. At the Mayo Clinic in 1952, curative resection was possible in only 2 of 60 patients operated upon for carcinoma of the pancreas.[1]

Although experience is discouraging as far as curative resection is concerned, surgery has much to offer in the way of palliation. Jaundice, anorexia, weakness, and pain increase with the progress of the disease. One of the most distressing symptoms is the severe itching of the skin which accompanies the jaundice. We shall discuss the surgical measures which may help in ameliorating these and other symptoms of the disease.

Cattell has suggested the following four palliative operative procedures to be used for the treatment of patients with nonresectable lesions: (1) ligation of the arterial supply to the tumor, (2) anastomosis of biliary tract and intestine, (3) pancreatojejunostomy, and (4) gastroenterostomy.[2]

Ligation of the gastroduodenal and inferior pancreaticoduodenal arteries is designed to retard the growth of the tumor. This procedure is technically difficult and offers little hope for real change in tumor growth. Recent anatomic studies have shown the arterial supply of the pancreas to be much more complex than was thought heretofore.[3]

An anastomosis between biliary tract and intestine is usually thought of as being the first step in the palliation of carcinoma of the pancreas. Some surgeons have advocated anastomosis between gallbladder and stomach, because the low bacterial count of the gastric content makes cholangitis less likely.[4-6] The chief objection to this type of anastomosis, as pointed out by Lahey, is the great disproportion between the thin wall of the distended gallbladder and the thick wall of the prepyloric portion of the stomach.[7] The duodenum is an unsatisfactory location for biliary anastomosis because of its proximity to the tumor and the likelihood of the tumor encroaching upon the anastomotic site. The most common type of anastomosis is cholecystojejunostomy. It can be performed without difficulty and is very

WILLIAM SIDNEY GLASSMAN *is chief surgical resident and* PAUL WARREN JOHNSTON *is assistant chief of general surgery at the Veterans Administration Hospital, Long Beach, California.*

satisfactory for relieving the jaundice. Cholangitis has not been a complicating factor with this type of anastomosis.

The restoration of the flow of pancreatic enzymes into the intestine by pancreatojejunostomy has been used to improve the nutrition of the patient whose pancreatic duct is obstructed by carcinoma.[8] The oral administration of pancreatin can also be used to correct the deficiency of external pancreatic secretion. Pancreatojejunostomy is technically difficult and may be complicated postoperatively by the serious consequences of a pancreatic fistula. Under these circumstances the oral administration of pancreatin is the more practical solution.

Gastroenterostomy for Duodenal Obstruction

Gastroenterostomy is used in those patients in whom duodenal obstruction is present. This obstruction is caused by displacement or invasion of the duodenum by the carcinoma of the pancreas.

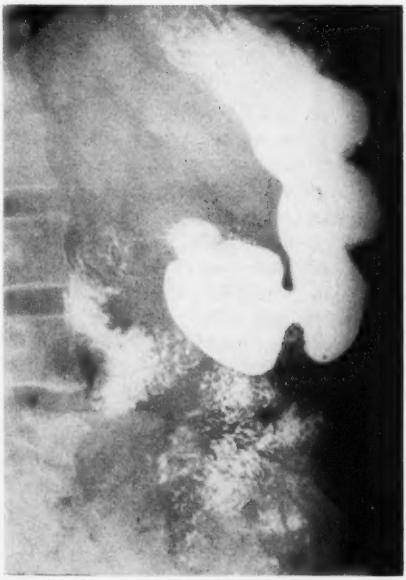

FIG. 1. *Upper gastrointestinal roentgenogram before surgery. Duodenal obstruction not demonstrated.*

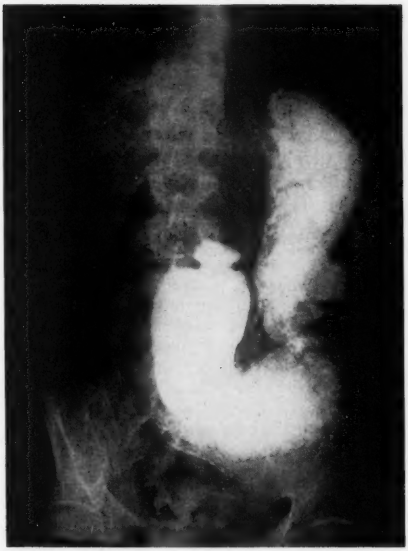

FIG. 11. *Upper gastrointestinal roentgenogram, taken less than three months after surgery. Much gastric retention is shown.*

Since 1948, 20 patients at the Long Beach Veterans Administration Hospital have received palliative operations for carcinoma of the pancreas. Our experience with these 20 patients has brought out an important consideration which has altered our plan of treating carcinoma of the pancreas palliatively. Three of the patients later had duodenal obstruction and required gastroenterostomy some weeks or months after cholecystojejunostomy had satisfactorily relieved the jaundice. A fourth patient, whose operation was performed in another hospital but whose treatment was similar, had this same complication.[9] Because of these experiences, we now carry out a gastroenterostomy at the same time the cholecystojejunostomy is performed in anticipation of duodenal obstruction. The gastroenterostomy is included in the pro-

cedure whether or not there is clinical or x-ray evidence of duodenal obstruction at the time of operation.

Case History

A case report will illustrate the unpleasant sequence of events which may arise if no measures are taken to prevent duodenal obstruction secondary to carcinoma of the pancreas.

The patient, a 56-year-old man, entered the hospital complaining of jaundice, weakness, and weight loss. The gallbladder was easily palpable and laboratory tests indicated an obstructive type of jaundice. An upper gastrointestinal roentgenogram was taken shortly after admission, and was interpreted as normal (figure I). He was operated upon and found to have a carcinoma of the head of the pancreas. Invasion of the portal vein precluded resection and a cholecystojejunostomy and jejunojejunostomy were performed.

The patient made an uneventful recovery and was discharged from the hospital ten days later. He returned one month later complaining that he vomited everything that he ate. After a few days of intravenous feedings and nasogastric suction, he was able to take small amounts of food by mouth. He was again discharged but returned to the hospital with the same complaints. An upper gastrointestinal x-ray film taken on this latest admission demonstrates complete obstruction of the duodenum (figure II). Slightly less than three months after cholecystojejunostomy, it was necessary to perform a gastroenterostomy for relief of the duodenal obstruction. Four months later, at the time of his last visit, the patient was eating well and was not jaundiced.

From the Surgical Service, Veterans Administration Hospital, Long Beach, California.

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FAILURE to obtain positive reactions to skin tests after middle age may indicate loss of cutaneous reactive power, rather than absence of a specific sensitivity. As shown by many hundred tests for each age group, response to food allergens is most frequent in the first decade of life, diminishes somewhat up to 50, then drops abruptly. Skin reactions to histamine in nonallergic persons also decline slowly from the second decade on, but fall most steeply after 60.

To determine skin capacity, histamine may be injected in subcutaneous doses of 0.02 cc. Normally, the 1:100,000 dilution causes a slight reaction and 1:10,000 slight to moderate change. Poor reactivity is demonstrated by negative results with the more dilute injection and a doubtful or slightly positive response to the higher concentration.

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Blood changes in the aged

NOEL PATRICK ORCHARD, M.D.
DARTFORD, ENGLAND

Complete blood and bone marrow examinations were given to 150 men and women between the ages of 65 and 99 years. From a statistical analysis of the results it was concluded that anemia is not one of the physiologic changes observed in senescence.

◆ "Old people are anemic," wrote Lorand in 1912.[1] This belief persists, even in these enlightened times, through lack of accurate data, through frequent use of such terms as "senile anemia" in the literature, or through passive acceptance of a time-honored dictum.

Although the subject aroused much interest in the past, the published results are far from agreement. The values given in some reports are grossly abnormal, making it clear that the persons studied were suffering from anemia secondary to a pathologic process. In view of the discrepant results, and of the availability of a large series of suitable cases, it was felt that a further investigation of the problem would be of value.

Subjects and Methods

The ensuing survey embraced complete blood counts and absolute values, mean corpuscular diameters, erythrocyte sedimentation rates, red cell fragility tests, and bone marrow examinations, in 150 old men and women who were free from diseases known to influence hemopoiesis.

The study was carried out at St. John's Hospital, Battersea, London, an institution for chronic sick, on 58 men and 92 women residents, ranging from 65 to 99 years in age. The great majority were there because they had no homes of their own nor relatives to care for them. Apart from the common finding of chronic bronchitis and emphysema, they could be classed as normal for their age group. The remainder had had cerebral or coronary thrombosis, ununited fracture of the neck of the femur, and senile dementia. The standard conditions for the estimation of hemoglobin levels, as laid down in 1945 by the Hemoglobin Committee of the Medical Research Council, were fulfilled:

1. The diet was adequate in all respects.
2. No abnormality of gastric or intestinal function was present.
3. There was no increased demand for hemopoietic factors which was not adequately compensated by increased diet.
4. No change in the relative plasma volume could be detected.
5. There was no intercurrent disease affecting the hemoglobin level.

Blood was obtained from the cubital vein, without stasis, approximately one hour after breakfast, with the subject still in bed. Red and white cell counts were made with a Neubauer counting chamber. Pipettes were calibrated by the National Physical Laboratory. Differential count was done on Leishman-stained films. Hemoglobin was estimated as alkaline hematin in a photoelectric absorptiometer.[2,3]

Wintrobe's method was used in determining erythrocyte sedimentation rate. After one hour, a reading was taken and the packed cell volume determined by

NOEL PATRICK ORCHARD, *until recently a consultant pathologist of the Dartford Group of Hospitals, Kent, England, is now consultant pathologist of the Ballarat Base Hospital, Victoria, Australia.*

centrifuging the tube at 3,000 r.p.m. for thirty minutes. Correction of sedimentation rate was made where necessary by reference to the chart of Whitby and Hynes.[4]

Red cell diameters were determined by caliper measurement of the magnified images which were projected on a ground-glass screen. The magnification of 1,000 was checked with a projected microscale. The diameters of 200 cells were measured in each film, which was stained by Leishman's method.

Results

The results were subjected to statistical analysis, and are reported under their respective headings.

RED CELL COUNT

The mean red cell count for men over 65 was 5.04 million per cu. mm.; for women, 4.82 million; and for the whole group, 4.91 million. In the men, there was a tendency for the red cell count to fall with advancing years. The difference between the first and third age groups and between the second and third age groups was statistically significant. In the women, the red cell count tended to rise above the age of 84. The differences between the first and third, and second and third age groups were also statistically significant.

TABLE 1
RED CELL COUNT

Age group	*Number of observations*	*Mean± standard error (millions)*	*Range (millions)*	*Standard deviation*
Men				
65-74	22	5.16±0.13	4.03-6.11	0.61
75-84	26	5.08±0.11	3.64-6.05	0.56
85+	10	4.64±0.19	3.54-5.38	0.60
Total	58	5.04±0.08	3.54-6.11	0.60
Women				
65-74	28	4.76±0.10	3.37-5.65	0.54
75-84	38	4.71±0.09	3.47-5.96	0.53
85+	26	5.04±0.10	3.85-6.06	0.49
Total	92	4.82±0.05	3.37-6.06	0.53
Entire series	150	4.91±0.05	3.37-6.11	0.57

Table 1 shows that there is no essential change in the red cell count in the aged.

TABLE 2
HEMOGLOBIN

Age group	*Number of observations*	*Mean± standard error (in gm. %)*	*Range (in gm. %)*	*Standard deviation*
Men				
65-74	22	15.67±0.39	12.96-18.50	1.80
75-84	26	15.74±0.31	10.82-19.31	1.60
85+	10	14.28±0.51	10.97-16.28	1.60
Total	58	15.46±0.23	10.82-19.31	1.72
Women				
65-74	28	14.52±0.34	10.03-17.73	1.80
75-84	38	14.13±0.31	10.37-18.47	1.90
85+	26	15.32±0.33	13.01-18.74	1.70
Total	92	14.58±0.19	10.03-18.74	1.81
Entire series	150	14.92±0.15	10.03-19.31	1.83

HEMOGLOBIN

The use of per cent values for hemoglobin is both unsound and misleading because of the normal hemoglobin variation, not only in subjects of different ages and sex but in those of the same age and sex. It seems necessary, for accuracy, to establish an arbitrary normal for each group. Therefore hemoglobin values are reported in gm. per cent, the standard of 100 per cent corresponding to 14.8 gm. of hemoglobin per 100 cc. of blood.

The mean value for the men was 15.46 gm. per cent; for the women, 14.58 gm. per cent; and for the whole group, 14.92 gm. per cent. The difference between the means for the men and for the women was statistically significant. In the men, there appeared to be a fall, and in the women, a rise in the hemoglobin level after the age of 84.

Table 2 shows that the hemoglobin levels of old people are within normal limits.

MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION

The mean corpuscular hemoglobin concentration was used in preference to the color index as the latter is misleading, making the retention of per cent values of hemoglobin imperative.

The mean value for the men was 34.83 per cent; for the women, 34.49 per cent; and for the whole group 34.62 per cent.

Table 3 shows that the mean corpuscular hemoglobin concentration values are normal in old age.

TABLE 3

MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION

Age group	*Number of observations*	*Mean± standard error (per cent)*	*Range (per cent)*	*Standard deviation*
Men				
65-74	22	34.80±0.36	32-38	1.70
75-84	26	34.90±0.37	32-38	1.90
85+	10	34.70±0.60	32-37	1.90
Total	58	34.83±0.23	32-38	1.78
Women				
65-74	28	34.80±0.32	31-38	1.70
75-84	38	34.00±0.37	30-38	2.30
85+	26	34.80±0.45	30-38	2.30
Total	92	34.49±0.22	30-38	2.12
Entire series	150	34.62±0.17	30-38	2.00

PACKED CELL VOLUME

The mean for the men was 44.62 per cent and for the women, 42.29 per cent—the difference being statistically significant. The mean for the whole group was 43.19 per cent. Beyond the age of 84, the men showed a decrease, and the women an increase in packed cell volume.

Table 4 shows that the women have a lower packed cell volume than the men, but the mean value for the whole group is within normal limits.

MEAN CORPUSCULAR VOLUME

The mean corpuscular volume for the men was 88.49 cubic microns; for the women, 87.94 cubic microns; and for the whole group, 88.15 cubic microns. The men showed a slight increase in the mean corpuscular volume with advancing age; this was not seen in the women.

Table 5 shows that the mean corpuscular volume of the aged is within normal limits, with no significant sex difference.

TABLE 4

PACKED CELL VOLUME

Age group	*Number of observations*	*Mean± standard error (per cent)*	*Range (per cent)*	*Standard deviation*
Men				
65-74	22	45.50±1.07	35-58	5.00
75-84	26	45.20±0.82	34-55	4.20
85+	10	41.30±1.36	34-49	4.30
Total	58	44.62±0.62	34-58	4.69
Women				
65-74	28	41.80±0.94	30-51	5.00
75-84	38	41.60±0.68	33-50	4.20
85+	26	43.90±0.63	38-50	3.20
Total	92	42.29±0.45	30-51	4.27
Entire series	150	43.19±0.37	30-58	4.58

MEAN CORPUSCULAR DIAMETER

The mean corpuscular value for the men was 7.58 microns and for the women, 7.50 microns; the mean for the whole group was 7.53 microns.

TABLE 5

MEAN CORPUSCULAR VOLUME

Age group	*Number of observations*	*Mean± standard error (per cent)*	*Range (in cu. μ)*	*Standard deviation*
Men				
65-74	22	87.70±1.05	77.7-97.1	4.90
75-84	26	88.80±0.74	81.5-95.8	3.80
85+	10	89.30±1.60	82.7-95.9	4.90
Total	58	88.15±0.57	77.7-97.1	4.37
Women				
65-74	28	87.70±0.83	79.6-95.7	4.40
75-84	38	88.50±0.91	78.8-104.1	5.60
85+	26	87.40±0.98	81.2-103.9	5.00
Total	92	87.94±0.52	78.8-104.1	5.01
Entire group	150	88.15±0.39	77.7-104.1	4.78

TABLE 6

MEAN CORPUSCULAR DIAMETER

Age group	Number of observations	Mean± standard error	Range	Standard deviation
Men				
65-74	22	7.56±0.05	7.00-7.92	.23
75-84	26	7.58±0.05	6.90-7.96	.27
85+	10	7.65±0.08	7.23-8.00	.24
Total	58	7.58±0.03	6.90-8.00	.25
Women				
65-74	28	7.52±0.04	6.96-7.93	.23
75-84	38	7.45±0.04	6.59-7.98	.25
85+	26	7.55±0.04	7.10-8.09	.23
Total	92	7.50±0.02	6.59-8.09	.24
Entire series	150	7.53±0.02	6.59-8.09	.24

The mean corpuscular diameter is significantly increased in old age and there is no real sex difference.

WHITE CELL COUNT

For the men, the mean white cell count was 7,205 per cu. mm.; for women, 6,494 per cu. mm.; and for the whole group, 6,769 per cu. mm. After the age of 84, the men show a significant rise in the white cell count.

The differential white cell count showed no deviation from the normal distribution.

The table shows that the white cell count is within normal limits in the aged. The sex difference is of doubtful significance.

TABLE 7

WHITE CELL COUNT

Age group	Number of observations	Mean± standard error	Range	Standard deviation
Men				
65-74	22	7,341±550	4,700-14,800	2,582
75-84	26	6,846±328	3,700-10,100	1,671
85+	10	7,840±705	4,900-12,000	2,231
Total	58	7,205±279	3,700-14,800	2,127
Women				
65-74	28	6,711±358	3,300-11,700	1,892
75-84	38	6,471±298	2,900-12,200	1,838
85+	26	6,296±315	3,000- 8,900	1,605
Total	92	6,494±185	2,900-12,200	1,770
Entire series	150	6,769±159	2,900-14,800	1,947

COOKE NUCLEAR COUNT

An appreciable diminution in percentage of young and 2-lobed forms of polymorphonuclear cells was found. Percentage of cells with 3, 4, and 5 or more lobes was significantly increased. Moreover, the number of granules in the cytoplasm of the polymorphs was found to vary inversely as the number of lobes.

Table 8 makes it clear that in the aged the polymorphs show a definite shift to the right.

TABLE 8

COOKE NUCLEAR COUNT

Sex	Number of observations	Young forms	2-lobed	3-lobed	4-lobed	5-lobed
		(per cent)				
Men	58	0.67	6.90	55.20	29.90	7.33
Women	92	0.99	3.06	60.02	29.90	6.03
Entire series	150	0.87	4.54	58.15	29.90	6.53

ERYTHROCYTE SEDIMENTATION RATE

Correction of sedimentation rates was deemed necessary in order to obtain comparable results, and Wintrobe's method was chosen as it lends itself to correction. However, the corrected rate can sometimes be misleading, especially when the uncorrected rate is high.

The mean for the men was 17.84 mm. in one hour, for the women, 17.51 mm. in one hour; and for the whole group 17.64 mm. in one hour. There was a tendency for the rate in the men to increase with advancing years but this was not so in the women. There was no significant sex difference.

Table 9 shows that the erythrocyte sedimentation rate is raised and quite variable in old age.

RED CELL FRAGILITY

Before use, the heparinized blood was fully aerated by gentle rotation for five

TABLE 9

ERYTHROCYTE SEDIMENTATION RATE

Age group	*Number of observations*	*Mean± standard error*	*Range*	*Standard deviation*
Men				
65-74	22	16.20±1.92	4-33	9.00
75-84	26	17.70±1.72	3-32	8.80
85+	10	21.80±3.51	5-32	11.10
Total	58	17.84±1.21	3-33	9.25
Women				
65-74	28	18.10±2.04	2-43	10.80
75-84	38	18.70±1.72	4-40	10.60
85+	26	15.20±2.02	2-34	10.30
Total	92	17.51±1.10	2-43	10.49
Entire series	150	17.64±0.82	2-43	10.03

minutes in a large beaker. Hypotonic saline solutions, of initial pH 6.4, with an interval of 0.025 per cent and a range of 0.5 to 0.3 per cent, were prepared from a 1 per cent saline solution. This range of saline solutions was found to be adequate. The solutions were made up the day before, as unexplained hemolysis occurred occasionally if they were used the same day. To each tube, 20 cu. mm. of blood was added and mixed by inversion. After thirty minutes, the tubes were centrifuged at 2,500 r.p.m. for ten minutes. The supernatants were read in a photoelectric absorptiometer against a water blank. The standard was prepared by adding 20 cu. mm. of blood to 2 cc. of 0.1 per cent sodium carbonate. An Ilford spectrum yellow filter, No. 606, was used. Reliable results were obtained only between 5 and 95 per cent hemolysis.

The red cell fragility of 20 subjects over 65 and 20 subjects between 17 and 35 was investigated. Results were plotted on arithmetic probability paper, and the mean corpuscular fragility and standard deviation were determined.

It was clear from this latter study that the red cell fragility was increased and was more variable in the aged. There was a noticeable increase in the number of hyporesistant cells and a slight increase in the number of hyperresistant cells. Provided the osmotic resistance was normally distributed, the results, when plotted on arithmetic probability paper, yielded straight lines, as did the fragility results of the young. But the lines for the aged were on the whole irregular, suggesting existence of a heterogeneous red cell population, each group of cells having its own mean corpuscular fragility and standard deviation.

THE BONE MARROW

Bone marrow was obtained by puncture of the iliac crest. Not more than 0.25 cc. of marrow was aspirated. A small portion of the sample was used in making films, which were later stained by Leishman's method. The remainder was deposited at the bottom of a Dreyer's tube, allowed to clot, then removed for fixation in 10 per cent formol saline. Sections were cut and stained with hematoxylin and eosin. In a differential count on Leishman-stained films, 400 cells were counted. The megakaryocytes were counted, in terms of the number seen in 50 low-power fields. Sections of marrow were studied.

The bone marrow from the iliac crest in old age appeared more fatty and slightly less cellular than similar marrow of the younger age group but no noticeable deviation from the normal differential range was found. The normoblasts showed a slight but constant increase in number. The leukoerythrogenic ratio was on the whole depressed and fluctuated between low normal and subnormal values. No lymph follicles were found.

Discussion

It would be unwise to compare results of work done in different countries and at different periods and draw definite conclusions. Some differences in the reported values can be accounted for by the dietary conditions at that time. The shortage of red meat after World War II left its mark in England, which now has levels for the red cell count and hemoglobin below prewar levels.

Osgood, investigating the red cell counts of young adults, reported 5.4 million per cu. mm. for the men, and 4.8 million per cu. mm. for the women.[5] Wintrobe obtained almost identical results.[6,7] The published figures are very variable for the aged. In Denmark, Bing gave the mean for men and women as 6.1 million and 5.1 million.[8] Rudd, of the same country, reported a mean of 5.14 million for old men.[9] Olbrich gave 5.025 million and 4.761 million as the means for men and women respectively, with the mean for the whole group as 4.906 million.[10] The corresponding values in our investigation are 5.04 million, 4.82 million, and 4.91 million. A few workers in the same field – Millet and Balle-Helaars[11] and Newman and Gitlow[12]– published low values, making it clear that some of their subjects were anemic.

A significant sex difference noted by Bing[8] and Olbrich[10] was confirmed in our findings. Osgood mentioned 600,000 as the mean difference between the red cell count of young men and women.[5] Olbrich reported the difference in the aged to be 310,000 and we found a difference of 220,000. Fowler and co-workers reported no sex difference[13] but it must be remembered that their cases were not altogether normal. Thus it is clear that the gap between the sexes is narrowed with advancing years. During the course of our investigation, it was observed that the emphysematous male subjects had high red cell counts.

The variety of methods and standards used in the estimation of hemoglobin limits the value of comparison. The time factor and the country in which the investigation is carried out must be considered in drawing conclusions.

Williamson reported the following means for old people: up to 75, 15.22 gm. per cent and beyond 76, 15.67 gm. per cent.[14] He commented on the sex difference but said it was much less than that seen in young adults. Cameron and Nicholson reported a mean of 16.6 gm. per cent at 60, 15.9 gm. per cent at 70, and 15.7 gm. per cent at 80 years for men; women had slightly lower values.[15]

TABLE 10
MEAN HEMOGLOBIN VALUES FOR THE AGED
(*gm. per cent*)

	Men	*Women*	*Entire group*
M.R.C. Hemoglobin Committee (1945)	14.6	14.21	
Olbrich (1947)	14.90	14.00	14.41
This study	15.46	14.58	14.92

The figures reported by the Medical Research Council Hemoglobin Committee[16] and Olbrich have been corrected to bring them in line with the new standard. The old 100 per cent standard was thought to correspond to 13.8 gm. per cent of hemoglobin per 100 cc. of blood; it was shown later to correspond to 14.8 gm. per cent.[17,18] Study of these figures reveals that the hemoglobin level of the aged has risen somewhat since the end of World War II; it is reasonable to suppose that the level for the general population has also risen. It is suggested that the present higher level is the result of improved dietary conditions.

Abnormally low hemoglobin values were reported by various observers.[9,11,13,19] Newman and Gitlow published the lowest mean value of 12.65 gm. per cent for men and 11.70 gm. per cent for the women.[12] It is obvious that some of these subjects were definitely anemic.

The sex difference, which is appreciable in the young, still persists to a lesser degree in the aged, despite the fact that the hemoglobin level of men tends to fall with advancing years, while that of women tends to rise after the menopause. Single women under 55 have a higher mean hemoglobin than married women of the same age, but beyond that age there is no difference associated with the marital state.

The only reference to the mean corpuscular hemoglobin concentration in old age is that made by Newman and Gitlow who reported mean values of

29.6 per cent for men and 32.3 per cent for women.[12] The value for the males is subnormal. The concentration in this investigation was found to be normal.

Our mean values for the packed cell volume were 44.62 per cent for men and 42.29 per cent for women. These figures are similar to those published by some investigators,[20,9] although still others reported subnormal values.[13,12] All workers, however, agree on the one point of a significant sex difference.

The normal value for the mean corpuscular volume for young adults is 87± cubic microns.[21] The mean values of this investigation, 88.49 cubic microns for men and 87.94 cubic microns for women, closely approximate those reported by Olbrich. It is clear that there is no difference between the mean corpuscular volume of the young and that of the aged. Newman and Gitlow reported high mean values for old people: 97.7 cubic microns for men and 90.0 cubic microns for women.[12] These workers, it will be recalled, reported low figures in other hematologic studies and it is beyond doubt that many of their patients were anemic. Mills showed that the mean corpuscular volume of anemic patients was subject to wide fluctuations—a difference of 18 per cent in two hours.[22]

The reported values for the mean cell diameter are discrepant, partly because of the various methods used. The main reason is the difficulty of measuring the red cell diameters. The most accurate method is that of Ponder, who photographed the cells in plasma with the result that his values are higher.[23] Millar showed that the diffraction method was 10 to 20 per cent less accurate than the photographic method.[24] The use of dried films was deplored by Ponder; he and Saslow demonstrated the variability of shrinkage of the cells in films prepared simultaneously and from the same samples of blood.[25] Nevertheless, measurement from photomicrographs or of projected images is reasonably accurate.

Various factors, such as dehydration, pH, temperature, intake of food, and violent exercise, have been reported as influencing the mean cell diameter. Price-Jones observed an increase of diameter during the day and a decrease during sleep,[26] findings which were confirmed by Pijper by the diffraction method.[27] These so-called diurnal variations, which are more apparent than real, are the direct result of the variability of shrinkage of the cells produced by drying.

The following are a few "normal" values quoted by different workers:

Ponder and Millar—8.8 microns (wet preparation)[28]

Jorgensen and Warburg—7.7 microns (wet preparation)[29]

Price-Jones—7.2 microns (dried film)[26]

Pijper—7.5 microns (dried film; halometer)[27]

The reported values for old people are in close agreement. Fowler and coworkers[13] obtained a mean of 7.5 microns and Olbrich[10] a mean of 7.6 microns; the figure for this investigation is 7.53 microns. Price-Jones, who obtained a mean of 7.7 microns for aged emphysematous subjects, said the increase in the diameter was due to a rise in the CO^2 content of the blood.[26] Olbrich, referring to the nonemphysematous subjects, suggested the increased blood lactic acid as the probable cause.[10]

Regardless of the method used, it is clear that the mean corpuscular diameter is increased in old age. During this investigation it was observed that the diameter of emphysematous subjects was higher than that of nonemphysematous subjects.

Osgood, reporting on 269 young subjects gave 7,400 as the mean value for the white cell counts;[5] Price-Jones and co-workers reported 8,007 ± 221 as the mean for capillary blood and 6,483 ± 155 as the mean for venous blood, the difference being statistically significant.[30] The various figures quoted for the aged are within normal limits; the differences observed may be due to the fact that some workers used capillary blood and

others, venous blood. Whereas Newman and Gitlow reported a sex difference,[12] Olbrich observed none.[10] The sex difference obtained in this study was of doubtful significance.

Olbrich's report of a definite shift to the right in the polymorphs and a reduction in the number of cytoplasmic granules in relation to increased lobation[10] were confirmed in our study.

Ponder said that polylobation was the result of the aging process;[23] Crosman and Charipper went further, saying that polylobation was also related to the activity of the cell;[31] but Bunting rejected the idea that polylobation was in any way dependent on the age of the cell.[32] All workers agree that the number of granules is an index of the activity of the polymorphonuclear cell.

Although there is no quantitative change in the leukocytes in old age, there is a definite qualitative change as compared with the young, so that there is an increased number of effete leukocytes in the circulation.

Direct comparison of the reported erythrocyte sedimentation rates for old age is not practicable because of the various methods used. Nevertheless, it is obvious that the erythrocyte sedimentation rate is raised in old age. For young adults, the normal range by the Wintrobe method is 0 to 10 mm. in one hour. It is difficult to fix a normal value for old age, as minor, symptomless foci of infection are commoner in the elderly, and have a greater effect on the sedimentation rate.

Several investigators[33-36,19] have reported raised erythrocyte sedimentation rates in old age, an observation confirmed in our study. Low-Beer found that the females had higher values than the males;[35] Isaacs confirmed this finding and said the sedimentation rate was more rapid during the second hour.[20]

A raised sedimentation rate has been found to be associated with a raised plasma fibrinogen level.[37-40] Ropes[41] and Aldred-Brown and Munro[42] stated that there was no correlation between the rate and plasma proteins. Gordon and Wardley[43] on the other hand said the sedimentation rate was dependent on the inhibitory action of one protein fraction on another.

The raised erythrocyte sedimentation rate of old age has been attributed to vascular degeneration[33] and to raised plasma cholesterol.[34] I found, in studying correlation coefficients and regression equations, that the raised rate of old age was related to the increased plasma fibrinogen level. Correlation with the globulin level was variable, and insignificant with the albumin level. The plasma cholesterol level was found to have little effect on sedimentation rate.

Gram observed a raised plasma fibrinogen level in association with nearly all infective processes and malignant disease.[38] The fibrinogen level was found to be higher in the aged and it is suggested that unsuspected, minor foci of infection and, in a small number of cases, symptomless carcinomata, may be the cause. Chronic bronchitis itself does not affect the sedimentation rate; 2 subjects with chronic bronchitis, who died during the investigation, were found at autopsy to have localized bronchiectasis. During life they were apparently well but had raised sedimentation rates. Two women who died during the course of the investigations were found at autopsy to have symptomless carcinomata. Their sedimentation rates were raised and apart from this no other abnormality was found.

The red cell fragility should be completely described by determining the mean corpuscular fragility and its standard deviation. Comparison of the mean corpuscular fragilities reported by various workers is unsafe because of the different methods used. It has been shown that the red cell fragility varies as the CO_2 content of the blood,[44,45] therefore the use of unaerated venous blood will

give a variable and a higher mean. To maintain standard conditions, the blood should be fully aerated before use.

Newman and Gitlow[12] observed a normal fragility in old age; Reicher[46] and Olbrich[10] described an increased fragility in the aged. The latter found the fragility more variable than in the young and said there was a noticeable increase in the number of hyporesistant cells and a slight increase in the number of hyperresistant cells. These observations were confirmed in our study. When plotted on arithmetic probability paper, our results yielded irregular lines, suggesting a heterogeneous red-cell population, each group with its own mean and standard deviation.

Lymph follicles have been observed in adult bone marrow, and more frequently in the marrow of those over 40.[47,48] No follicles were seen in our 150 specimens, but this may have been due to the small amount examined.

A moderate increase of hemohistiocytes and plasma cells and a constant marked fatty degeneration of the sternal marrow in the aged has been reported[49] as well as a decrease in the number of primitive myeloid cells.[50] A reduction in the number of normoblasts and an increase in the leukoerythrogenic ratio has been encountered[50] as well as reverse findings.[49] An increase in the number of megakaryocytes, plasma cells, and normoblasts and a great increase in the number of polymorphs has been found.[51]

I found the iliac crest bone marrow to be slightly less cellular and more fatty than similar marrow from young adults. The number of primitive myeloid cells and the leukoerythrogenic ratio were diminished, and the number of normoblasts was increased, observations which agree with those of Cheli and Giordano. At autopsy, bone marrow contains almost no lymphocytes, while that obtained during life is mixed with circulating blood and always has a fair percentage of lymphocytes. Thus, this observation is open to criticism and it is more than likely that these workers mistook lymphocytes for micronormoblasts.

Conclusions

In this investigation, undertaken in an endeavor to assess the hematologic values in the aged, it was found that:

1. The red cell counts, hemoglobin levels, and absolute values are all within normal limits in the aged. The mean corpuscular diameter is distinctly raised and its variability, as measured by the standard deviation, is not great.

2. The white cell and differential counts are normal, but there is a marked shift to the right in the polymorphs, as determined by the Cooke nuclear count. Assuming that polylobation is a sign of increasing age and that scanty cytoplasmic granulation is an indication of diminished activity, there is in old age, a pronounced increase in the number of effete cells in the circulation.

3. The erythrocyte sedimentation rate is increased in the aged. By means of correlation coefficients and regression equations, the raised sedimentation rate was shown to be related to the increased fibrinogen level.

4. The red cell fragility is fully described by the mean corpuscular fragility and its standard deviation. The osmotic resistance of red cells to hypotonic saline is distinctly increased in old age as compared with the young. The results, when plotted on arithmetic probability paper, yielded irregular lines on the whole, suggesting the presence of a heterogeneous red cell population, each group with its own mean corpuscular fragility and standard deviation. Compared with the young, the fragility in the aged is more variable.

5. There is no gross change in the iliac crest bone marrow in the aged. It is slightly less cellular and slightly more fatty than similar marrow of the young. The percentage of normoblasts is appreciably increased and the leukoerythrogenic ratio is depressed.

6. It seems reasonable to conclude that anemia is not one of the physiological changes observed in senescence; the erythron does not participate to the same degree as other structures, in the involution of tissues which characterizes the aging process.

This work formed part of a thesis submitted for the doctor of medicine degree of the University of London. The investigation was suggested by Dr. Trevor Howell, consultant geriatrician, St. John's Hospital, London, who made all his cases available for investigation.

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Needed research on age and functional efficiency

Comment on selected problems and methods

JOSEF BROZEK, Ph.D.
MINNEAPOLIS, MINNESOTA

This paper comments on (1) age changes in body composition and their potential relevance to studies of physical performance; (2) the complex relations between occupational work and health; (3) the need for data on aging and actual job performance; and (4) use of miniature work situations in research on aging.

◆ The investigations on aging carried on since 1947 in the University of Minnesota Laboratory of Physiological Hygiene have been focused on the effects of the mode of life, particularly diet, on the cardiovascular system. In the psychologic area, attention has been directed toward personality changes rather than toward sensory functions or motor and intellective performance. Nevertheless, some of the researches on body composition, field studies, analyses of mortality statistics, and use of laboratory work tests may have implications for investigations on changes in work capacity with age.

Body Composition

The decrease of strength with age is one of the oldest gerontologic facts—Quetelet published his observations, recalculated by Fisher and Birren,[1] just one hundred twenty years ago. Yet, our understanding of the *mechanisms* underlying the alterations in muscle strength is not complete. Histologic changes in the cerebellum and in the pyramidal tract are likely to be involved. However, the fact remains that we do not have the much simpler data on changes in the size of the muscles, as measured from limb circumferences or diameters with correction for subcutaneous fat, and as determined from the "soft-tissue" roentgenograms. The latter technic yields information on three structural components of the body—bone, muscle, and subcutaneous adipose tissue. It does not, unfortunately, provide information on the amount of intramuscular fat.

The study of differential tissue growth must be carried on beyond childhood and adolescence into maturity and senescence, and must consider muscle as well as fat.[2,3] Neither the bulk nor the composition of the body remains stationary during maturity. Body weight tends to increase for several decades after adult height has been reached.[4] This appears to be a complex process involving deposition of adipose tissue, paralleled by some muscle atrophy.[5,6]

Our information is based largely on indirect methods for the study of body composition, based on the separating of body weight into the fat and the fat-

JOSEF BROZEK *is associate professor of physiological hygiene, University of Minnesota.*

free fraction.[7] In samples of young and middle-aged men matched for height and weight, the fat-free weight of the older individuals was substantially lower.[5] The difference was interpreted as being due largely to a decrease of muscle mass.

Physical exercise does not prevent the deposition of adipose tissue, but it seems to retard or eliminate the atrophic changes in the muscle mass, noted in the process of "normal" aging.[8] The physically active individuals are close to the normal young men in their fat-free body weight.

Work and Fitness

Age changes in work capacity represent only one aspect of the larger problem of the interrelationships between work, fitness, and health.

The effect of work on the individual is just as important, psychologically and physiologically, as the study of age changes in man's cardiorespiratory, sensory, motor, and intellective functions relevant to a given job.

Comparative studies of middle-aged and young normal men,[9,10] based on item analyses of personality inventories, brought out some points which are of interest. The younger men ranged from 18 to 26 years in age, with a mean of 22 years, and the older men from 46 to 56, with a mean of 50 years. The younger group were university students and the older group were drawn from the ranks of business and professions.

Yes, physical exercise lacks appeal for a larger fraction of the older men—19 versus 9 per cent. There are several indications of a decreased social drive, with 65 versus 79 per cent enjoying participation in group activities. Bothered sometimes by constipation? Surely—30 versus 12 per cent. However, one of the largest differences is in the pressure exerted by work—56 and 14 per cent, respectively, "work under a great deal of tension." Here we have the work situation molding or, at least, constantly impinging on personality.

Graf compared the incidence of deaths among the general male population in Germany and among business executives and leading professional men.[11] The sample of general population consisted of 199, 759 deaths observed in Western Germany in age groups from 40 to 90 years in 1950. The deaths among the executives were registered between 1949 and 1952. Table 1, based on Graf's data, indicates an excess mortality among the executives in the age range of 50 to 70. The difference between the actual and expected death frequencies, examined by the chi-square test, was reported to be highly significant statistically. No breakdown of the figures according to causes of death was made and, consequently, a discussion of the reasons for the observed excess mortality would be largely fruitless. The author interprets it as the result of excessive psychologic wear-and-tear. Evidence from other studies would direct attention to physical work and diet as more tangible and more readily assessed facets of the mode of life.[12,13]

Several sets of data have been made available recently, indicating the impor-

TABLE 1

INCIDENCE OF DEATH AMONG MALE BUSINESS EXECUTIVES AND PROFESSIONAL MEN, AND FIGURES CORRESPONDING TO THE MORTALITY EXPERIENCE OF THE GENERAL POPULATION IN WESTERN GERMANY

Age group	*Executives (actual)*	*General population (expected)*	Δ	Δ%
40-44	31	41	−10	−24.4
45-49	63	64	− 1	− 1.6
50-54	102	81	+21	+25.9
55-59	135	93	+42	+45.2
60-64	152	121	+31	+25.6
65-69	189	162	+27	+16.7
70-74	180	206	−26	−12.6
75-79	159	196	−37	−18.8
80-84	103	133	−30	−22.6
85-89	38	55	−17	−30.9
Total	1152	(1152)		

tance of physical work to the maintenance of health, specifically to the delay of that most devastating aging process—the development of atherosclerosis.[14] Morris and his associates[15] in England advanced the hypothesis that men in physically active jobs have a lower incidence of coronary heart disease in middle age than have men in physically inactive jobs. They believe to be still more important the fact that the disease is not so severe in physically active workers, tending to present first in them as angina pectoris and other relatively benign forms, and to have a smaller early case fatality and a lower early mortality rate. Analysis of three sets of data favored strongly the acceptance of the hypothesis. In the sample under study, heavy workers from 45 to 64 years in age had half the mortality from coronary disease as light workers. Heavy workers died less often than light workers in the first clinical attack of the coronary heart disease. Bus conductors on double-decker vehicles had less coronary heart disease than the less active bus drivers, and postmen less than telephonists, civil service executive officers, and clerks. The data of Biörck, collected in Sweden, indicate the same kind of relationships between the intensity of physical activity at work and the incidence of symptoms of coronary disease.[16]

Unquestionably, we are facing complex facts. Morris and coworkers noted that at least three sets of factors should be investigated in reference to the development and course of coronary heart disease: (1) physical activity and inactivity; (2) other occupational factors; and (3) factors associated with social class status, including possible nutritional factors.[15] It was noted that among certain occupations, particularly in the upper social classes, there may be a cluster of unfavorable factors.

It may be emphasized that the obtained differences in mortality and morbidity are large. Those of us who exercise primarily the vocal cord muscles and who are involved in pushing a pencil may want to take a sharp look at those figures and their implications. A rigorous psychologic analysis of variations in man's mode of life and their implications for the aging process has hardly begun.

Actual Performance

One of the slogans advertising gasoline, "It's performance that counts," expresses the American pragmatic appraisal of goods, men, and machines. Looking at the psychologic literature on aging, one wonders whether this criterion is taken seriously, especially as far as industrial performance is concerned. What do we find in random perusing of textbooks of industrial psychology? Ghiselli and Brown limit themselves to a not very revealing sentence stating that "In many cases the performance of older workers will differ from that of the younger ones."[17] Chapanis-Garner-Morgan do not have an entry for "Age" in their subject index.[18] Poffenberger devotes a whole chapter to age and adjustment and discusses age changes in physical, physiologic, and psychologic characteristics but has no data on job performance.[19] Gray, to take a more recent work, considers—as do others—accidents and age, abilities, outlook, and industrial activities, yet the section on age and job performance has no data whatsoever on actual performance on the job.[20]

Relevant data do not seem to be at hand. The absence of well-documented information on this important point is distressing. While it is readily agreed that the collection and interpretation of such data is not easy, it is a job to be done and one that can be done. In order to increase the validity of the results, information on the actual industrial production in selected standard operations should be obtained by pooling data on output in comparable tasks in a number of industrial plants.[21]

Beginnings on such a study were made years ago in a large shoe factory, considering jobs such as that of cutting out the soles or the uppers from a large hide, that involved a substantial number of workers and in which the performance could be evaluated quantitatively, as the men were paid on the basis of individual output. The war brushed aside this project.

It may be stressed that industrial operations are carried on at a submaximal level of effort, with a substantial margin of safety, whereas laboratory testing situations are structured so that they call for a high – theoretically, maximal – effort over a short period. Raising the effort level at work may compensate for the decline in actual work capacity. Also, important compensatory alterations may be made in work methods. Consequently, predictions of job performance of older individuals from psychologic tests of sensory, motor, and intellective functions are hazardous, especially when norms developed on young adults are used.

De Silva's studies on the safety of driving may be cited as yielding data which caution against hasty generalizations and unwarranted predictions. While the physiologic components of driving fitness–glare vision, eye-hand coordination involved in steering, and braking reaction–show the decrease shared with other sensory and motor capacities, the safety of driving increases up to the age of 50.[22] Millions of miles driven per fatality was used as criterion.

Unquestionably, we deal here again with a complex situation. Yet I know of no more eloquent example of the fact that actual performance can improve even when the physiologic functions or components of the performance undergo deteriorative changes.

Miniature Work Situations

The difficulty and, for the most part, impossibility of rigorous experimental research on physiologic stresses in industry led to a systematic survey of so-called miniature work situations as a research tool.[23] It was felt that the analytic approach to work capacity was too abstract for the elucidation of the effects of physiologic stresses, such as high humidity, high temperature, or inadequate illumination, imposed on the industrial worker. The miniature work situations represent a research tool which bridges the wide gap between the analytic, componental laboratory investigations and the complex industrial processes. They combine, if properly constructed and used, the realism of the studies made directly in a plant with the possibilities of systematic research, characteristic of the laboratory approach.

We have reviewed their uses in connection with questions of general and specific occupational fitness, training, reciprocal adaptation between man and machine, and the stresses resulting from performance under suboptimal environmental conditions. It was felt that miniature work situations are of considerable potential value in the experimental study of the human factor in industry and that they represent a promising approach for the study of physiologic stresses persisting in machine-age industry. More recently the problem was considered in the framework of a systematic evaluation of performance in reference to nutrition.[24]

The use of realistic work tests in controlled studies on industrial performance was described by Graf, with special reference to the regulation of speed of the assembly line and problems of posture in women.[25] The registration methods, including work output, are indicated and references to earlier applications of the approach in the assembly-line laboratory of the Max Planck Institute for Industrial Physiology are given.

In the Laboratory of Physiological Hygiene we have used a miniature work situation in studies on illumination, with six subjects working simultaneously.[26, 27]

The visual task consisted in the recognition of letters presented in a random order on a belt moving behind a narrow vertical slit. The test reproduced the essential features of industrial inspection of items transported on a conveyor. The level of difficulty could be varied by changing the size of letters, the duration of exposure of the critical details, degree of contrast between the letters and the background, and the intensity and quality of illumination.

The work period was two hours. In addition to output – number of letters correctly recognized in a 200-letter sequence–and to work decrement, blinking rate was determined during work and a battery of visual tests was given before and at the end of the work period.[28, 29] It should be noted that the performance criteria–average level of output and the decrement in performance serving as a criterion of fatigue–were substantially more sensitive to the stress of suboptimal illumination than any of the analytic visual tests.

The classical but, alas, much too rare an application of the principle of miniature work situations to the study of aging is represented by the work of K. R. Smith.[30] The assembly of nut-and-bolt units was used as the work task. Of particular interest are the data obtained in four hours of uninterrupted work. The work task, in terms of type of manipulation and the duration of the work period, resembled with reasonable approximation an actual industrial operation. Using the performance of the 30-year-old group as 100 per cent reference, the average output decreased to 94 per cent in the 40-year group and to 86 per cent in the 50-year group.

Conclusions

1. Additional information is needed on anatomic changes with age, especially the size and composition of the muscle mass.

2. The relation between individual and work is a two-way proposition. More attention should be given to the psychologic and physiologic significance of work and its impact on the worker.

3. Essentially no data were found on actual industrial production of men and women at different age levels.

4. Miniature work situations, that is, laboratory work tests which represent a replica or a modification of an industrial task, bridge the gap between the analytical, simple, factorially "pure" laboratory tests and actual work situations. They are a promising, but until now much neglected, tool of gerontologic research.

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(References, omitted because of lack of space, will be found in the author's reprints.)

The nature of fatigue

DAVID B. DILL, M.D.
ARMY CHEMICAL CENTER, MARYLAND

Fatigue is engendered by stress, which may have a physical origin, such as that produced by work at high temperatures; or which may have an emotional basis, such as the friction between business associates. It is a temporary disturbance of equilibrium, and may be primarily physiologic, as in depletion of energy reserves, or psychologic, as in frustration.

◆ There appears to be one characteristic common to all varieties of fatigue in biologic systems: a disturbance of balance between wear and repair. With that as a thesis let us examine the manifestations of this disturbance in muscular activity.

The Fatigue of Muscular Work

Toxicologists have found it convenient to evaluate the effects of toxic vapors in terms of Ct—the product of concentration of vapor and duration of exposure. In some instances, this product is constant over a wide range of concentration but even when it is not, the concept remains useful. The same concept can be applied to muscular work: the capacity for work and the fatigue induced by it are related to its intensity and duration. At one extreme is the 50-yard dash lasting about five seconds and at the other, a day's labor in heavy industry which, with overtime, may last for twelve hours. In the first example, the work is accomplished with the reserves of oxygen in the blood and lungs plus the body's resources of anaerobic energy. In the second, the work must be entirely aerobic.

In bursts of maximal activity, man can reach a maximum energy output within a few seconds and in sprints can maintain this rate for twenty or thirty seconds. Thereafter the rate falls off. This type of fatigue has much in common with the classical fatigue seen by every beginning student of physiology in the nerve-muscle preparation. Recovery of the sprinter is rapid—if well-trained, he is capable of two or three first-rate performances within an hour. As the duration of activity lengthens, the rate of energy exchange which can be sustained falls off. The role played by reserves of anaerobic energy becomes less important. In maximal exertion leading to exhaustion in about four minutes, such as in the mile run, the oxygen intake during the run accounts for about two-thirds of the energy transformed, whereas in a marathon run lasting two and one-half hours, anaerobic reserves are not called on except possibly in a sprint at the finish. Thus, it is clear that anaerobic reserves are not heavily drawn on except in sport and in emergencies. The hypothesis once advanced, that accumulation of lactic acid and its removal are features of work and recovery, has limited application. The laborer, even in heavy industry, does not accumulate lactic acid or any other metabolic break-down product, according to available evidence.

In work of long duration, there are some easily recognized types of breakdown, all associated with fatigue. One type is seen in exposures to high tempera-

DAVID B. DILL *is scientific director of the Chemical Corps Medical Laboratories at the Army Chemical Center, Maryland.*

tures. Under some circumstances, while body temperature is kept within the usual limits, profuse sweating, sometimes with restricted water intake, leads to heat exhaustion, marked by vasomotor collapse. There may be deficiency of water; if so, relief comes from supplying water alone. When much salt is lost in the sweat and copious amounts of water are drunk, heat cramps occur, but these are rarely experienced except by men doing heavy work in high temperatures. They may be prevented by adding salt to the drinking water or increasing salt intake at meals. Heat cramps are quickly relieved—in ordinary cases by drinking salt water and in more severe cases by intravenous saline.[1] In another form of heat breakdown, called heat stroke, sweating decreases and the body temperature rises. It may reach 110° F. without irreversible injury provided there is rapid cooling, as in an ice and water bath. This may be seen in any walk of life in extreme hot weather.

The nutritional state may be a factor in fatigue. While inadequate nutrition probably is less prevalent in this country than ever before, it must be considered even here and viewed as of major importance in much of the world.

Many laboratory studies have been made on fatigue as related to the nutritional state. At the Harvard Fatigue Laboratory, it was found that when a man works intermittently for twenty-four hours without food, carbohydrate reserves are exhausted and body fat reserve supplies the energy for work almost exclusively.[2] Injections of adrenalin speeded up the rate of carbohydrate consumption.

In a dog used as an experimental subject, a metabolism rate approximately twenty times basal brought on exhaustion in about four hours, with blood sugar down about 50 mg. per 100 cc.[3] When the same dog was given glucose candy every half-hour, he would continue running and, in a record performance ran for seventeen hours without exhaustion. The run was interrupted for five minutes every half hour for a drink, candy, measurement of rectal temperature, and blood sample. In the seventeen hours, he ran 82 miles up a 17-degree grade, equivalent to climbing a height more than twice that of Everest, with an energy expenditure of 150,000 kilogram-meters for each kg. of body weight. Evidently he could not utilize fat fast enough to accomplish this feat. Another dog once ran at a slower rate for twenty-four hours, with similar interruptions but with no food during the last fifteen hours. She expended 64,000 kilogram-meters per kg. during the first nine hours and 79,000 in the last fifteen. At this rate she was able to utilize body fat fast enough to supply the energy required.

In a German war-time study, a group of 20 workmen in the Ruhr were fed entirely by factory management.[4] Production measured in ton-days depended on the calories supplied above the basic need of 1500. Quoting from their report:

> Their task was composed of dumping debris out of railway cars and changing the rails to advance the points of dumping. A measure of the work done was given by the number of tons of debris dumped per hour and man. At the beginning the workmen did not receive the rations for heavy workers. They had, besides their calories for resting metabolism, 820 work calories per day and dumped 1.5 tons per hour . . . later the workmen received the rations for heavy workers . . . After one year 2.2 tons per man and hour were dumped with an average of 1,300 work calories. The body weight of the workers increased about 4 kg. during that year, proving that the capacity for work, given in the rations for heavy work, was not fully utilized. Since the termination of the embankment was urgent, the workers were promised cigarettes for greater production. At first, 2.5 tons per hour was the minimum production for which this premium was awarded; after several weeks the premium was graduated, the maximum being given for 3 tons and later on even for 4 tons. This induced a considerable increase of output, 3 tons soon being attained by nearly every man; after the last increase of the premium limit the average output reached

3.4 tons. The premium system lasted for the last half year of the embankment construction, during which time the 20 workers lost, on the average, 3.5 kg. of weight.

The result of these observations is clear. In the time without premiums production varied directly with available calories, yet the actual production differed enough from the energy equivalent of the rations to allow an increase in body weight. With the awarding of cigarette premiums the proportionality between output and available calories was lost at once. Output surpassed so much the range of calorie possibilities that the deficit had to be made up continuously from the very substance of the body.

The same investigators studied the performance of Ruhr coal miners. To produce the standard two tons of coal per day, each miner must have 4200 calories, 1800 to live and 1200 per ton of coal mined. When the rations were cut, the coal output fell off at this same rate, that is, one ton per 1200 calories. A simple calculation shows that an extra pound of wheat supplied as bread would have had a potentially equivalent coal production of 1.25 tons.

These studies suggest that fatigue in the ordinary day's work helps maintain homeostasis and that restricting calories limits work output and so conserves body reserves. While the nature of this internal mechanism is obscure, its existence cannot be denied.

In this country, during the same war period, Keys and his associates conducted a noteworthy study of human starvation and rehabilitation, using conscientious objectors as subjects. Those who wish to acquaint themselves with the problems raised by inadequate nutrition, associated decreased work capacity, and increased fatigue are referred to the two-volume work published in 1950.[5]

Fatigue of Emotional Origin

The topic of fatigue requires a venture into the realm of the social sciences. When the Fatigue Laboratory was organized at Harvard in 1927 its advisory committee included the dean of the medical school, a general physiologist, a biologist, the dean of the business school, and a professor of industrial research in the business school. This last member, Elton Mayo, had already initiated a study of fatigue in factory workers. A room in the Hawthorne works of the Western Electric Company was set aside for these investigations, and here several employees assembled relays on a piece-work basis. Each worker's output was measured during the several years of this study and the same members were retained as far as possible. Their task did not change materially, but environmental conditions were altered from time to time. For example, no change in output could be ascribed to the level of illumination even though this was varied from the equivalent of the light of the full moon to bright midday. With each phase of the study, production tended to increase. The hypothesis was advanced that the social equilibrium is a prime factor in determining work performance; emotions and sentiments may have greater influence on productivity than temperature, humidity, illumination, and other features of the physical environment. Those who are interested in this and related investigations will find them described in Mayo's *Human Problems of an Industrial Civilization*.[6]

Fatigue Studies in Britain

The conclusions reached by Mayo and his group recall a long series of studies in England begun in World War I. In 1917 the Industrial Fatigue Research Board was organized to continue wartime investigations. In the thirteen years of its existence, 59 reports were issued in the following fields:

Hours of work, rest pauses	10
Industrial accidents	5
Atmospheric conditions	9
Vision and lighting	5
Vocational guidance and selection	7
Time and motion studies	10
Posture and physique	4
Miscellaneous	9

Mayo, after an analysis of these reports, comments that "The single discovery, the simple remedy, the one best way, had failed to materialize. (There are) . . . multiple factors closely interrelated and all potentially important. . . ." After 1930 the work of the Board was under a new title, Industrial Health Research Board.

In seeking for a common characteristic of fatigue, it appears that the concept of a disturbed equilibrium or, as Cannon might have said, a breakdown of homeostasis, deserves attention. Both intensity and duration of the stress or stresses are important in all types of fatigue. For example, fatigue that has both physiologic and psychologic features, arises from lengthening the working day. In World War II in England, an official engineer's report on this topic was summarized in *The Engineer*.[7] In the first World War, exhaustive investigation had led to the conclusion that the work week should not exceed fifty-five or sixty hours even in emergencies. However, World War II's generation forgot or ignored this conclusion. In the Battle of Britain in 1940, the Government appealed for extra work. Factories were operated twenty-four hours a day, seven days a week, cancelling all holidays. Output increased for a few weeks but at the end of two months it began to decline. Absenteeism increased and men arrived late for work. Frequently they worked on Sunday for double pay and then took time off in the middle of the week. In the Royal Ordnance factories, Sunday labor was discontinued in July without decreasing weekly production. One factory, after reducing hours, set a new record for weekly production. Once more it was recommended that the work week not exceed fifty-five hours. The following conclusions were reached:

> Increased hours of work above an optimum, which varies slightly with different industries, do not increase production proportionally and may actually decrease it.
>
> When heavy overtime is worked for prolonged periods, the general health of workers is undermined.
>
> If overtime has been prolonged, a reduction in hours will increase output although there will be a time lag corresponding to recuperation of energy.
>
> If general health is undermined, a reduction in working hours will fail to effect the required increase of output.

The subcommittee also emphasized that fatigue may be alleviated by proper attention to working conditions, with particular attention to ventilation and illumination. Eyestrain may become a serious problem in addition to the fatigue it engenders.

In March 1952, the Ergonomics Research Society, organized during World War II, staged a symposium on fatigue at the College of Aeronautics, Cranfield, bringing together anatomists, physiologists, and psychologists, with engineers and others interested in the design of machinery and equipment for human use. Many of the papers presented have been published under the title *Fatigue*.[8] Among the topics dealt with were: the physiologic background of fatigue; visual fatigue with special reference to lighting; neglect of the surroundings in relation to fatigue decrements in output; psychological criteria of fatigue; and the psychologist's problem in measuring fatigue.

Résumé

It is impossible to condense in a few words all that has been said about fatigue by physiologists, psychologists, sociologists, and engineers. As a venture, however, the following aphorisms on fatigue in man are advanced:

Fatigue is engendered by stress.

Comment: The stress may be physical, such as that produced by work in high temperature; emotional, such as that caused by friction between hot-tempered associates; or mixed, such as that produced by hazardous tasks in an uncomfortable environment.

Fatigue is a temporary disturbance of equilibrium.

Comment: The disturbance may be primarily physiologic, as in depletion of energy reserves, or psychologic, as in frustration from lack of appreciation on the part of superiors. At the end of eight hours' work the disturbance will be slight if all has gone well or large if tasks have been difficult and unrewarding.

Recovery from fatigue occurs during periods of relaxation and sleep.

Comment: The period of relaxation is not necessarily a period of physical inactivity. For the sedentary worker it may well include strenuous physical activity.

Excessive fatigue coupled with incomplete recovery leads to breakdown.

Comment: Several workers died during the first summer of construction of Boulder Dam. Eight hours of hard work and excessive sweating were followed by sixteen hours in Boulder Canyon dormitories that were too hot for sleeping. Before the next summer, air-conditioned dormitories were built on the cooler plateau at Boulder City. Recovery of physiologic equilibrium was imposssible during the first summer and easy during the second. The emotional stresses of combat also may lead to breakdown if too frequent or so long continued that recovery is incomplete between engagements.

A work week of more than fifty-five hours is uneconomical.

Comment: The health of the worker suffers and management loses money.

Fatigue is to be desired rather than feared.

Comment: Life without stress is uninteresting and unhealthy. The man is fortunate whose work tires him, gives him a good appetite, and promotes a good night's sleep.

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Diabetes case finding among 1000 patients over 60

EUGENE J. CHESROW, M.D., and
JOHN M. BLEYER, M.D.
OAK FOREST, ILLINOIS

One thousand patients between 60 and 110 years of age had a postprandial blood and urine sugar screening test, and of these, 248 with a positive reaction were given an oral glucose tolerance test. Reactions were of diabetic type in 64 and of prediabetic type in 24. Only 17 of the 88 patients had an elevated fasting blood sugar.

◆ A diabetes case-finding program was carried out among the geriatric patients of the Oak Forest Infirmary, Oak Forest, Illinois, in an effort to assess the number of unsuspected diabetics. Ever since the classic work of Wilkerson and Krall in 1947, diabetes detection drives have been widely conducted among the general population[2-12] but not, to our knowledge, in a large institution for the aged. We believe it appropriate, therefore, to present the results and observations of our study.

Methods

One thousand patients, 640 ambulatory and 360 bedridden or chairfast, ranging in age from 60 to 110, were screened for diabetes mellitus. Age and sex distribution of patients is shown in table 1, and admitting diagnoses in table 2. Known diabetics were excluded.

Between two and two and one-half hours after breakfast or midday meal, each containing at least 50 gm. carbohydrates, blood was drawn from the cubital vein for blood sugar determination. No tourniquet was used, but gentle pressure was applied 1 or 2 inches above the vein. The patient was then asked for a urine specimen.

Prior to the screening tests and subsequent tolerance tests, patients were put on a general diet of 2500 calories containing approximately 320 gm. carbohydrates.

The reducing substances in the urine were determined qualitatively with Clinitest[13] tablets. The blood was tested for sugar by the Wilkerson-Heftmann tablet method.[14, 15]

Patients whose blood sugar screened above 130 mg. per cent or who had a trace or more of reducing substances in the urine were given an oral glucose tolerance test which was performed in the morning after about twelve hours' fasting. One hundred gm. glucose, dissolved in 500 cc. chilled water and flavored with the juice of a lemon, were given. Blood samples from the cubital vein and urine samples were taken before and one-half hour, one hour, two hours, and three hours after the test drink.[16] As during the screening tests, no tourniquet was used since, if applied in the usual manner, it may cause fluctuations in venous blood sugar levels.[17] During the test, patients were at bedrest

EUGENE J. CHESROW *is medical superintendent of Cook County Institutions, Oak Forest, Illinois.* JOHN M. BLEYER *is chief medical resident on rotation from Cook County Hospital to Cook County Institutions.*

TABLE 1

AGE AND SEX OF PATIENTS SCREENED

Age group	*Men*	*Women*	*Total*
60-69	289	104	393
70-79	314	88	402
80-89	123	62	185
90-99	15	3	18
100-109	0	1	1
110	0	1	1
Total	741	259	1000

and not allowed to smoke, eat, or drink. The test was discontinued if a patient vomited.

In all blood samples of the glucose tolerance tests, the true blood sugar was determined by the Somogyi[18] and Folin-Wu[19] procedures, as advocated by Mosenthal and Barry.[20] In 182 instances, a second determination was made on the same three-hour blood specimen by the original Folin-Wu method alone for comparison. Urine sugar was determined qualitatively with Clinitest[13] tablets and acetone with Acetone Test powder.[14]

TABLE 2

ADMITTING DIAGNOSIS OF PATIENTS SCREENED

Diagnosis	*Number of patients*
Generalized arteriosclerosis	317
Arteriosclerotic heart disease	170
Hypertension	157
Cerebral thrombosis or hemorrhage	80
Rheumatoid and other chronic, non-infectious arthritides	64
Neurologic disorders, including parkinsonism and multiple sclerosis	52
Fractures with delayed healing	43
Amputation	19
Pulmonary tuberculosis, inactive	18
Carcinoma	16
Hernia	10
Total blindness	9
Chronic pulmonary diseases, exclusive of tuberculosis	8
Varicosities	7
Valvular heart disease	5
Miscellaneous	25
Total	1000

Results

Although during the course of screening, blood was obtained from 1000 patients, a simultaneous urine specimen could be secured from only 876 screenees, or 86.6 per cent.

In 244 patients, or 24.4 per cent, the true blood sugar test, taken two to two and one-half hours postprandial, was above 130 mg. per cent. Of these, 44 also had sugar in the urine. In 34 patients, only the urine was positive, ranging from a trace in 27 patients to 1+ to 4+ in 7. On one repeat postprandial examination, only 3 of the 34 patients had reducing substances in the urine, as shown in table 3.

Of the 278 positive specimens, 109 of the blood and 25 of the urine samples were obtained between 7 and 8 a.m. and 135 of the blood and 53 of the urine specimens between 2 and 3 p.m. Thus, the chances for a positive urine test seem to be more than twice as high in the early afternoon as in the morning. The same condition holds for the blood test. However, of 88 patients who later had a diabetic or prediabetic glucose tolerance, 47 had positive screening tests in the morning and 41 in the early afternoon.

An oral glucose tolerance test was given to 248 of the 278 patients with a positive blood or urine screening test, and they were then divided into three groups according to their glucose tolerance: (1) diabetic, (2) potential diabetic, and (3) normal. There were 64 patients in Group 1, 24 in Group 2, and 160 in Group 3. The designations "diabetic" and "potential diabetic" are used to characterize the behavior of the blood sugar during glucose tolerance tests, but in the clinical sense, they indicate only presumptive diagnoses (table 3).

The glucose tolerance test of the diabetic group was characterized by glycosuria and by failure of the blood sugar to return to a normal value of 100 mg. per cent at the third hour, or, if it did

TABLE 3

DIABETES CASE FINDING RESULTS IN 1000 PATIENTS OVER 60

Age group	Number screened	Positive screening tests: Blood and urine pos. No.*	Blood pos. No.*	Urine pos. No.*	Total of positives No.*	Negative screening tests No.*	Tolerance tests	Diabetics, newly discovered: M	F	Total‡	Potential diabetics, newly discovered: M	F	Total‡
60-69	393	17	77	12	106	287	93	18	7	25	4	5	9
		4.3%	19.6%	3.3%	27.2%	72.8%				2.5%			0.9%
70-79	402	20	83	12	115	287	101	22	5	27	7	3	10
		4.9%	20.6%	2.9%	28.4%	71.6%				2.7%			1.0%
80-89	185	5	38	10	53	132	50	6	6	12	3	1	4
		2.7%	20.5%	5.4%	28.6%	71.4%				1.2%			0.4%
90-99	18	2†	2†	0	4†	14	4	0	0	0	1	0	1
						77.8%				0%			0.1%
100-109	1†	0	0	0	0	1†	0	0	0	0	0	0	0
										0%			0%
110	1†	0	0	0	0	1†	0	0	0	0	0	0	0
										0%			0%
Total	1000	44	200	34	278	722	248	46	18	64	15	9	24

*Percentage within age group.

†Number too small for statistical evaluation.

‡Percentage of total number screened.

return, its peak was above 150 mg. per cent. The tolerance curves of the potential diabetics did not return to normal after three hours and were not associated with glycosuria.

In the diabetic group, the fasting blood sugar was above the normal of 100 mg. per cent in 11 patients, or 17.1 per cent. The peak of the curve, reached in 38 instances, or 59.3 per cent, at the first hour and in 18 instances, or 28.1 per cent, at the second hour, was above 150 mg. per cent in 60 patients, or 83.7 per cent, and between 141 and 146 mg. per cent in 4 patients, or 6.3 per cent. Lower blood sugar than the fasting one, representing the "hypoglycemic phase"[21] was seen in 13 cases, or 20.3 per cent, always at the third hour. The tolerance curve did not return to normal at the end of the third hour in 44 patients, or 68.7 per cent. All patients had glycosuria during the test, varying from trace to 4+. Acetone, from a trace to 3+, was found in the urine of 28 patients, or 43.7 per cent.

The potential diabetics had always a normal fasting blood sugar. The peak of their tolerance curve was reached after one hour in 8 cases, or 33.3 per cent, and after two hours in 10 cases, or 41.6 per cent. It surpassed 150 mg. per cent in 17 patients, or 70.8 per cent. In this group, the tolerance curve never returned to normal by the end of the third hour nor was there any hypoglycemic phase. No patient had glycosuria during the test.

The glucose tolerance curve of the 160 patients of Group 3 was considered normal, returning to fasting values after two to three hours. The fasting blood sugars were below normal in all but one case in which it was 105 mg. per cent, but this returned to normal by the second hour. In 67 patients, or 41.8 per cent, the blood sugar was still elevated at the second hour. The peak of the curve was reached at the first hour in 87, or 54.3 per cent, at the second hour in 21 patients, or 13.1 per cent, and was above 150 mg. per cent in 33 patients, or 20.6

TABLE 4

COMPARISON OF DIABETIC, PREDIABETIC, AND NORMAL GLUCOSE TOLERANCE TESTS IN 248 PATIENTS OVER 60

Characteristics of the tolerance curve	*Diabetic (64 patients)*	*Prediabetic (24 patients)*	*Normal (160 patients)*
Fasting blood sugar above 100 mg. per 100 cc.	11(17.1)*	0(0)	1(0.6)
Peak above 150 mg. %	60(93.7)	17(70.8)	33(20.6)
Peak at first hour	38(59.3)	8(33.3)	87(54.3)
Peak at second hour	18(28.1)	10(41.6)	21(13.1)
Blood sugar elevated at third hour	44(68.7)	24(100.0)	0(0)
Hypoglycemic phase	13(20.3)	0(0)	66(41.2)
Glycosuria	64(100.0)	0(0)	†
Acetonuria	28(43.7)	0(0)	‡

*All numbers in parentheses are percentages.

†Glycosuria present in 17 patients forming a subgroup of unclassified glycosurias. Their blood sugar curves had the same characteristics as the others in the normal group.

‡Present in 3 (trace to 1+) of the 17 cases of unclassified glycosurias.

per cent. It went as high as 267 mg. per cent without causing glycosuria. A blood sugar below fasting value was observed in 66 patients, or 41.2 per cent. It occurred at the third hour in 60 patients, or 37.5 per cent, and at the second hour in 6, or 3.75 per cent. Glycosuria was present in 17 patients, or 10.6 per cent. However, as their blood sugars stayed below 142 mg. per cent during the whole test and returned to normal after three hours in each case, they did not fit into either of the groups mentioned and made up a subgroup of unclassified glycosurias. Table 4 summarizes the characteristics of the glucose tolerance tests of Groups 1 to 3.

Since the true blood sugar does not include the nonglucose reducing substances or saccharoids of the blood, its value is lower than the blood sugar reading of the Folin-Wu method which determines all reducing substances. Comparing the true blood sugar values with the Folin-Wu readings as determined simultaneously in 182 third-hour specimens, it was found that the difference varied between 0 and 47 mg. per cent in the diabetic and prediabetic groups and between 0 and 42 mg. per cent in the normal group. The mean difference between all true blood sugars and all Folin-Wu values in the former group was 13.5 mg. per cent and in the latter, 14.3 mg. per cent.

As seen in table 3, the 244 positive blood screening tests far outnumbered the 78 positive urine tests. The number of blood sugars above screening level increased from the sixth to the seventh decade as well as in relation to the number of patients in the same age group.

The 64 diabetics made up 6.4 per cent and the 24 potential diabetics, 2.4 per cent of the 1000 patients screened. Thus, the total number of newly diagnosed, clinically presumptive, diabetics was 88, or 8.8 per cent. However, if corrected for the 30 positive patients who missed the tolerance test because of poor cooperation, this number would increase to 9.8 per cent. The number of new cases increased slightly from the fifties to the sixties and dropped sharply during the seventies. In the screened group the ratio of men to women was roughly three to one, and among the diabetic suspects it was close to two to one.

As shown in table 5, the incidence of diabetic glucose tolerance is highest in those with a positive urine and blood screening test and lowest in those with only a positive urine test. If only patients with positive urine tests were given a glucose tolerance test, 62 of our 88 new cases would have been missed. If just the positive blood screening tests were followed by a tolerance test, we would have missed only 9 of our 88 cases.

The admission diagnoses of the patients with diabetic and potential diabetic glucose tolerance are shown in

TABLE 5

RELATION OF SCREENING RESULTS TO GLUCOSE TOLERANCE TEST RESULTS

Screening results	*Positive cases*	*Glucose tolerance tests*	*Tolerance curve*		
			Diabetic	*Prediabetic*	*Normal*
Blood and urine pos.	44	38	11(28.9)*	6(15.8)	21(55.3)
Blood pos., urine neg.	200	178	47(26.4)	15(8.4)	116(65.2)
Blood neg., urine pos.	34	32	6(18.7)	3(9.4)	23(71.9)
Total	278	248	64	24	160

*All figures in parentheses represent percentages.

table 6. Hypertension and arthritides were relatively more frequent in the diabetic group and generalized arteriosclerosis, arteriosclerotic heart disease, and cerebral thrombosis were more common in the series as a whole.

Discussion

The Wilkerson-Heftmann blood sugar screening test, used in this study, is based on the Hagedorn[22] method and requires 0.1 cc. of whole blood. A blue color is negative, indicating that the true glucose content of a given blood specimen is below a certain screening level. A colorless solution is positive, indicating that it is above the given level. A light or indefinite blue color, which represents a borderline value slightly above or below the screening level, occurred in 80 of our 1000 cases. These were not followed further except in 6 cases in which the concomitant urine specimen was positive for reducing substances. Four of the 6 cases had a normal, 1 a diabetic, and 1 a prediabetic glucose tolerance.

TABLE 6

ADMISSION DIAGNOSES AND DIABETES CASE FINDING RESULTS

Diagnoses	*Incidence among 1000 screenees*	*Incidence among 88 diabetics and potential diabetics*
Generalized arteriosclerosis	317(31.7)*	27(30.6)
Arteriosclerotic heart disease	170(17.0)	12(13.6)
Hypertension	157(15.7)	20(22.7)
Cerebral thrombosis	80(8.0)	6(6.8)
Arthritides	64(6.4)	9(10.2)
Neurologic conditions	52(5.2)	3(3.4)
Fractures	43(4.3)	2(2.2)
Amputation	19(1.9)	3(3.4)
Cancer	16(1.6)	4(4.5)
Hernia	10(1.0)	1(1.1)
Tuberculosis, inactive	18(1.8)	1(1.1)

*All figures in parentheses represent percentages.

The Wilkerson-Heftmann test, with reagents in tablet form, takes less than five minutes, and is simple, economical, and accurate within approximately 10 mg. per cent.[14] The Wilkerson-Heftmann test is reliable and has been used successfully in a number of diabetes detection drives[6, 10, 12, 26] as well as in office practice.[24]

For comparative purposes, we adopted a screening time of two to two and one-half hours after meals as used in other case finding programs.[6, 12] This corresponds to the two-hour time limit by which the blood sugar should return to normal in the oral glucose tolerance test.[3, 27-30] However, as we have observed, in about 50 per cent of nondiabetic persons over 60, the glucose tolerance curve will not return to normal two hours after ingestion of glucose.[31] Mosenthal made similar observations.[32] Therefore, we anticipated that not all of the positive screenees would have a diabetic glucose tolerance.

The patients cooperated well during

the screening procedure. The high number of patients—124 in 1000—who could not give a urine specimen at the time blood was drawn might reflect the frequency of urinary difficulties in the aged. When the same problem was encountered during the glucose tolerance test, indwelling catheters were used.

In the evaluation of our glucose tolerance tests, more attention was given to the duration than to the height of the curve.[26, 28, 29, 32-37] Even so, 93.7 per cent of those with a diabetic tolerance curve had a peak value of true blood sugar above 150 mg. per cent, thus fulfilling Joslin's criteria.[5] On the other hand, 20.6 per cent of those with a nondiabetic glucose tolerance had peak values over 150 mg. per cent.

Using the criteria of Wilkerson,[7] Colwell,[34] Wilder,[38] and John[39] and results of our previous investigations[31] we felt that, even in the aged, the blood sugar will assume normal status of 100 mg. per cent three hours after ingestion of 100 gm. glucose.

The relative value of the fasting blood sugar in the diagnosis of diabetes mellitus is well illustrated by the fact that only 11 patients, or 17.1 per cent, of the diabetic group and none of the prediabetics had a high fasting blood sugar. Although this fact was described by John[10] and confirmed by others,[1, 28, 41] it is still not widely acknowledged.[42] Almost the same high incidence of normal fasting blood sugar found in our diabetics was reported by Perl[37] and by Petrie and associates.[43]

As we said before, the terms "diabetic," "potential diabetic," and "prediabetic" state are used to describe the individual biochemical-metabolic response to the glucose of the tolerance test. Although, in the words of Wilkerson and Krall,[1] the "presumptive laboratory evidence of diabetes" is high in our diabetic group, only further studies will enable us to confirm or reject the biochemical diagnosis of diabetes mellitus.

Various conditions, such as cerebral thrombosis, hyperthyroidism, hypertension, rheumatoid arthritis, severe arteriosclerosis, and so on, are said to lower the glucose tolerance and simulate mild diabetes. Studying the incidence of certain diseases, as given by the admission diagnoses, among our 1000 patients, we find that generalized arteriosclerosis, arteriosclerotic heart disease, and cerebral thrombosis occur less often among the diabetics than in the whole group. Therefore, it is improbable that these conditions per se would have imitated diabetes in our series. The higher incidence of hypertension and arthritides among our diabetics only confirms the fact that the combination of these entities with diabetes is more common. Hypertension and arthritis carry a high diabetic incidence.[44] Even if decreased glucose tolerance is part of the diabetic syndrome and does not indicate primary insulin deficiency, the condition still needs to be recognized and cared for.

We found 64 diabetics and 24 potential diabetics who together made up 8.8 per cent of 1000 patients screened. Paying less attention to glycosuria, as some authors suggest,[36, 55] would have put more prediabetics into the diabetic group. If 30 more positive screenees had cooperated in a glucose tolerance test, the percentage of newly discovered diabetics would have been 9.8 per cent. This probably could be increased further if 76 patients with a negative urine and a borderline result in the Wilkerson-Heftmann test had had a glucose tolerance test.

These considerations may partly explain the great gap between the number of 278 patients with positive tests and the 88 newly discovered cases. More important is the fact that, at least in this group, a high two-hour postprandial blood sugar does not necessarily mean a high tolerance curve at the third hour. Some inconsistencies in the values of repeated glucose tolerance tests have

long been known.[27, 46-51] Similarly, a screening test which is essentially an abbreviated tolerance test, may also vary on repetition in the same individual. Even Petrie and his associates, who used a higher screening blood sugar level than we did, observed that of 6,801 persons with abnormal screening tests, one-third had normal sugar tolerance on follow-up tests.[43]

The efficiency of the glucose tolerance tests in diabetes case finding among the aged could be improved either by increasing the screening blood sugar level or, perhaps better, by conducting the screening three hours after meals. Repetition of a positive screening test before the tolerance test would be of doubtful help. As has been shown, 34 persons of our series had only a positive urine test and negative Wilkerson-Heftmann test. On repeat examination under similar conditions, only 3 had a positive urine. Nevertheless, all 34 were given a glucose tolerance test which revealed 6 diabetics and 3 potential diabetics. Two of the 3 who had positive urines twice, had normal tolerance tests.

Calculating the percentage of newly discovered diabetics, we assumed, as have others before us,[6, 10, 12] that patients with a negative Wilkerson - Heftmann blood sugar test would also have a negative glucose tolerance test. However, the findings of Kurlander and associates cast some doubt on our assumption.[26] They found that in a clinically proved group of 226 nondiabetic and 21 diabetic persons, who were given a Wilkerson-Heftmann test with a level of 130 mg. per cent and a Somogyi-Nelson blood sugar test, negative cases were predicted with an accuracy of 96.9 and 97.8 per cent, and the positive cases with an accuracy of only 57.1 and 66.7 per cent. In other words, while almost all nondiabetics had a negative Wilkerson-Heftmann and a Somogyi-Nelson screening test, 9 with a negative Wilkerson-Heftmann test and 7 with a negative Somogyi-Nelson test had clinical diabetes.

More than twice as many urines screened positive in early afternoon as in the morning, and results in the Wilkerson-Heftmann blood sugar test were also more apt to be positive in the afternoon. Of the 88 newly discovered diabetics, 44 were positive in the morning and 41 in the early afternoon. These latter findings accord with those of other observers who found that, due to a rhythmic fall and rise of the blood sugar during twenty-four hours, the blood sugar and urine sugar of diabetics is higher in the morning than in the afternoon.[52-54]

The importance of the true blood sugar values has been stressed by some because of the great variability found in the amount of nonglucose reducing substances.[20, 23] While Haunz and Keranen observed a variation of 8 to 49 mg. per cent among nondiabetics,[23] we found, on the third-hour specimen, a difference of 0 to 47 mg. per cent in the diabetic and prediabetic and 0 to 42 in the nondiabetic group, closely approaching our previous findings in nondiabetics.[31]

The many diabetes detection drives among the general population have shown divergent results. The age of the persons screened, the various screening levels used, and the different diagnostic criteria may account for the large variations. The number of new diabetics discovered by various programs has varied from 0.0 to 14.0 per cent of the persons examined.[36] However, it appears that, with increasing age, the incidence of newly discovered diabetics will also increase.[1, 3, 8, 43, 56-58]

It is difficult to compare our results with those of previous detection programs as none, to our knowledge, was conducted primarily among aged patients. Our 6.4 per cent of newly discovered diabetics approaches closely the findings of Kenny and Chute who observed that, in women of 50 to 69 and

in men of 60 to 69, over 6 per cent were diabetics.[9]

According to the National Health Survey of 1935-36,[58] the onset of diabetes mellitus reaches a peak rate from 65 to 69 in men and women alike. More recently it has been shown that, in the general population, incidence of lowered glucose tolerance increases with age and is the highest in those over 70.[43] There is also a progressive rise in diabetes mortality with advancing age.[59-61]

The fact that the number of unsuspected diabetics among the aged is increasing and the fact that in patients over 60 the diabetic symptoms are less pronounced or even absent,[5,62] lend great importance to diabetes detection programs among the aged. Similarly, urine and blood sugar determinations should be included in the general clinical examination of the seemingly healthy persons over 60. The significance of unrecognized diabetes as an added burden to an aged patient cannot be overemphasized.

As the average age of the general population increases, so will the number of diabetics with late onset of their disease. Their chances of reaching the period of late complications will also be greater. All of this should add further impetus to our search for diabetes in the aged.

(References, omitted because of lack of space, will be found in the author's reprints.)

THE NUMBER of elderly diabetics is greater than ever before. Among 447 patients 70 to 90 years of age, 62.9 per cent were women. The average duration of the disease was twelve and one-half years. The incidence of onset reaches a peak during the sixth decade, but after 70, the onset of diabetes becomes increasingly rare.

Nearly every patient in this group had arteriosclerosis. The lesions associated with vascular disease included cerebral arteriosclerosis, 19.9 per cent; arteriosclerotic heart disease, 52.1 per cent; and peripheral vascular disease, 28.9 per cent. Half of the patients suffering cerebral arteriosclerosis had cerebral vascular accidents. Retinitis occurred in 22.6 per cent, hypertension in 59.7 per cent, and chronic nephritis in 5.1 per cent.

Arteriosclerotic heart disease included coronary sclerosis, 29.5 per cent; angina pectoris, 3.6 per cent; myocardial infarction, 7.6 per cent; and congestive heart failure, 11.4 per cent.

Although only 20.1 per cent of the patients had severe neuropathy, many more had sensory disturbances and loss of reflexes. Infections occurred in 24.6 per cent, cancer in 9.2 per cent, and gallbladder disease in 5.6 per cent.

Surgery was performed on 22.8 per cent of the patients. Half of the operations were amputations, with low spinal anesthesia.

When prescribing diet for elderly diabetics, problems of chewing, constipation, and diarrhea should be considered. The diets prescribed usually contain 140 to 200 gm. carbohydrates, 60 to 125 gm. protein, and 40 to 120 gm. fat. Older and more critical patients can sometimes be helped by carefully added proteins. A small insulin dosage is usually sufficient.

H. F. ROOT and P. BARCLAY: The octogenarian diabetic. Observations in cases of diabetes before and after the age of eighty years. Diabetes 4: 191-196, 1955.

Blueprint for a geriatric center

LEO GITMAN, M.D.
BROOKLYN, NEW YORK

This paper outlines the functions of a geriatric hospital center in a medical care program for the aged, and describes its integration with existing community services. The basic goal of such a center is to keep the aging person functioning in the community as long as possible.

◆ The challenge presented by an aging population can no longer be met by makeshift and haphazard methods. The task of providing geriatric care is reaching proportions which will overwhelm us unless we think ahead carefully, and make our plan now. This plan must have a clearly defined goal—an answer to what we mean by "meeting the problems of the aged."

The task of providing complete care of the aged has reached the stage beyond the capacity of any single organization, so that a multi-agency approach is required. On a city-wide basis, many of the necessary services are available in scattered units. We feel that it is essential that a joint committee, made up of representatives of cooperating organizations and agencies, coordinate the activities of the member units. This joint committee must not be a token affair, but must be financed and staffed so that it is effective in the day to day working of the over-all program. It must be able to meet requests for housing, homemakers, domestic help, medical and nursing care, and so on, by contacting the organizations providing this service.

Role of the Geriatric Center

It is suggested that the geriatric center constitute one of the participating organizations in the joint committee. We feel that a medical care program should develop around special units devoted to geriatrics.

LEO GITMAN *is executive medical director of the Brooklyn Hebrew Home and Hospital for the Aged, Brooklyn, New York.*

In highly populated areas like New York City, one such center in each borough might be necessary. Smaller cities would require a single unit and in small communities, the local hospital could provide requisite services.

The nucleus of a geriatric center exists in the organization with which I am affiliated. In its fifty years of service, the Brooklyn Hebrew Home and Hospital for the Aged has introduced many innovations in the care of the aged. At this half-century mark, we have embarked upon a program of expansion which is formulated in the blueprint for a geriatric center.

Medical Aims of Center

The organization and function of a geriatric center are governed by the goal we have set for ourselves. Our first consideration is, medically speaking, "How can we keep the aged person functioning effectively in the community as long as possible?" Our center will endeavor to

1. Keep the healthy aged in good health. This implies an effective program of preventive medicine which will slow down the rate of deterioration.
2. Provide facilities for treatment of acute and chronic illness. Many patients with such illness can be treated on an ambulatory

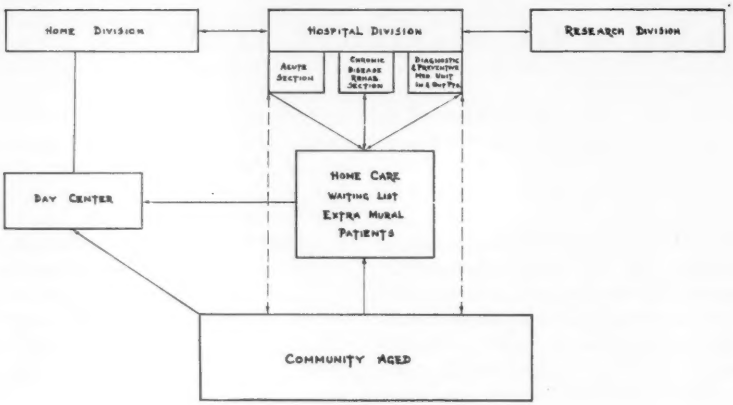


FIG. 1. *General plan of center.*

basis while remaining at home. If necessary, the patient is admitted to the hospital, receives treatment, and then is discharged back to the community. When this supportive program fails to keep the person functioning in the community, he is admitted to the center on a permanent basis.

3. Provide domiciliary care, when it is impossible for the individual to live alone in the community.
4. Provide research facilities to study the process of aging.

Organization of Center

As will be noted in figure I, there are three basic units in the general plan of organization: home division, hospital division, and research division. The hospital division will consist of three main sections—acute section, chronic disease and rehabilitation section, and diagnostic and preventive medicine section. The flow of patients from the community and the other divisions of the organization is facilitated so that they are sure to receive prompt attention as medical problems develop.

At present, this hospital division does not admit aged patients from the community at large. Its function is to provide adequate hospital facilities for patients in the other divisions of the institution and for those in our home care program. These latter persons are scheduled for admission to the institution at a future date, but with the services provided for them, they find it possible to continue to live in the community. It is hoped that, in the near future, the hospital division will care for the aged of the community whether or not they are in the home care program. It is planned to maintain an out-patient clinic for geriatric patients who are ambulatory. We are also planning a diagnostic geriatric unit for patients referred by physicians of the community. The results of the investigation will be forwarded to the referring physician with recommendation for therapy. In addition, it is planned to have the acute section of the hospital division admit aged persons as private patients of physicians on the hospital staff. Each physician will manage his own cases, utilizing the special technics and facilities of the geriatric institution.

The expansion of the home care program, as visualized in our plans, is illustrated in figure II. Here the managing unit is the home care control team, consisting of staff physician, staff nurse, social worker, and psychiatric case worker. This unit controls the flow of patients to the facilities of the hospital division,

and the flow of extramural services to the patients. The control team would apply to the committee for help in providing ancillary services. This program is a vital factor in maintaining the individual in the community.

The interrelationship of the various services of the day center program is illustrated in figure III. This activity is primarily concerned with the healthy aged, and is directed toward providing satisfying social activity for these persons. The participants live in their own homes, but spend the day at the day center engaged in any of the large number of activities. The unit in our home division, which is managed jointly with the Department of Welfare of New York City, has clearly demonstrated its effectiveness. This type of program is destined to become one of the basic elements of an adequate solution to the problems of the aged. The various ancillary services are available to care for the medical needs of persons in the day center program should they become acutely ill, chronically ill, or require diagnostic service.

An interesting extension of the home care and day center concepts could be used in connection with new housing projects. Let us assume that of ten units in a project, one is built especially for the aged. In this building, space can be set aside for day-center activities, with personnel provided by private or governmental agencies. This day center would serve residents of the building and other aged in the community.

A medical care clinic could also be established with a nurse in attendance. The home care control unit of the geriatric center would provide daily attendance of staff physicians who would also answer emergency calls. If hospitalization were required, the patient would be transferred to the acute hospital section of the geriatric center. If medical investigation were necessary, the patient could be handled in the clinic of the center, or, when indicated, admitted for diagnostic examination.

For minor illnesses, a small infirmary might be set up in the building unit, with the attending physician to make daily rounds in conjunction with his attendance at the clinic.

Research and Education

The research division is a semiautonomous unit on the same administrative level as the home and hospital divisions. Work in this division would consist of basic

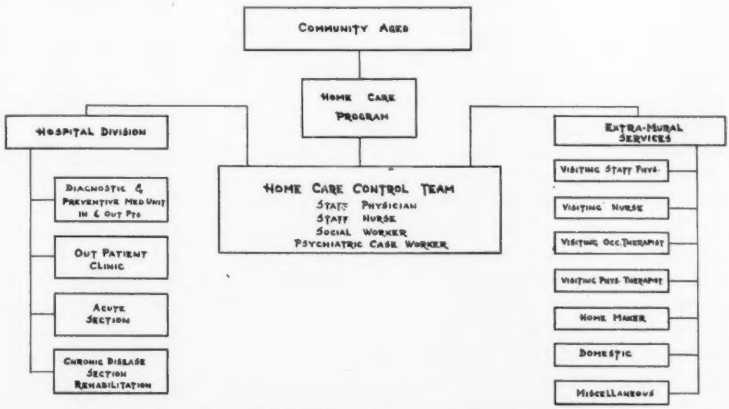


FIG. II. *Expanded home care program.*

laboratory investigation of predominantly animal material. The special technics and facilities would be available for clinical investigation conducted in the hospital division.

There is a plan, still in the discussion stage, to form an interhospital research group in Brooklyn, consisting of a general hospital, chronic disease hospital, and geriatric hospital to cooperate in long-term studies, utilizing the special clinical and laboratory facilities of each institution. This idea might be useful in other geographic areas.

Finally, an important function of a geriatric center is that of education in the field of geriatrics. It is planned that the geriatric center will provide opportunity for varying periods of training in the geriatric aspects of medicine, urology, orthopedics, dermatology, and so on, at internship, residency, and fellowship levels. Portions of this program will be conducted jointly with local general hospitals, and perhaps the local medical school. There should also be opportunity for the general practitioner to engage in this program. The geriatric center could also work with the committees on aging of the county medical societies.

In addition to the professional program, there should be corresponding educational activity with lay groups. Here, too, the activity would be integrated with the function of other agencies.

Since conditions vary widely throughout the country, no one plan can provide a satisfactory solution in all areas. In one situation an expanded general hospital might be adequate. Another approach consists of construction of domiciliary units built adjacent to general hospitals. The basic concept we have presented, however, remains unchanged.

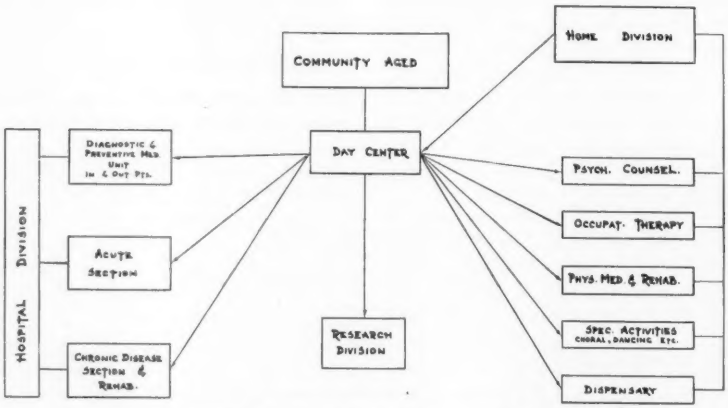


FIG. III. *Various services of day center program.*

Report from the Second Spanish Congress of Gerontology and Geriatrics

FRANCISCO VEGA DIAZ, M.D.
MADRID, SPAIN

◆ The Second Spanish Congress of Gerontology and Geriatrics was held in Valencia, Spain, under the direction of President M. Beltran Baguena, professor of geriatrics and internal medicine at the University of Valencia. Discussions were centered on the emphysema and cardiac pathology of old age.

Senile Emphysema

Professor Beltran Baguena led the first discussion on senile emphysema. Aged persons, he believes, are capable of normal life in proportion to their physical strength. In the strict sense of the word, there is no senile pathology caused by the simple fact of aging. However, in every illness occurring in old age, there is a special form of pathogenic attack and reaction, permitting differentiation of the senile clinical form. There is a question as to what can be included in the term "emphysema," since physiopathologists, anatomopathologists, and clinicians use the same word to designate quite different conditions. This divergence of opinion is very patent in the clinical study of senile emphysema.

FRANCISCO VEGA DIAZ *is chief of the cardiology department of the Institute of Industrial Medicine, Madrid.*

TYPES OF EMPHYSEMA

The three different forms of emphysema are: (1) anatomic, (2) pathochronic, and (3) pathogenic. Anatomically, there is a focal emphysema of reduced area from postinflammatory sclerosis; a vicarious emphysema, tending to compensate for physiologic involution af another sector; and a generalized emphysema affecting the whole lung. The first two are of the kind called by Mazzey and Remolar "sympto-emphysema," and the third is "disease-emphysema." From the pathochronic viewpoint, there is a reversible emphysema called "reactive alveolus-ectasia," or alveolar enlargement during diminution of the bronchus caliber, and an irreversible emphysema caused by interstitial sclerosis of the lung through atrophy of the alveolar parenchyma and the association of the two factors. Pathogenically, there are bronchogenic and thoracogenic emphysemas.

There are two clinical forms of the disease. There is a common form associated with chronic bronchitis, which develops in the three stages of (1) chronic bronchitis, (2) chronic bronchitis plus emphysema, and (3) chronic bronchitis plus emphysema plus right cardiopathy. Then there is a thoracic form, which may appear early in anomalies of the thorax, or delayed in senile kyphosis.

The three lesions which directly affect the respiratory parenchyma are: (1) alveolar atrophy with formation of vesicles through the disappearance of the interalveolar septa; (2) granular atrophy of the elastic tissue without compensating neoelastosis but with the presence of elastic fibers; and (3) rarefication of the vascular and capillary network of the parenchyma. Lesions of the cartilaginous and muscular tissues are: (1) those of the bronchial mucosa, which are reduced through lessening of the number of muciparous glands and blood and lymph vessels to sclerosis of the submucous connective tissue, and (2) those of the thorax.

In the physiopathologic concept of emphysema, there is a first phase in which the mechanical potentials of inspiration - aspiration come into play, a second phase of air penetration and circulation through the tubular system, and a third phase of alveolar ventilation.

THE RESPIRATORY UNIT

The *pneumone*, or respiratory unit, is centered on a bronchial axis sheathed in connective tissue, which is called the pedicle of the lobule and which is composed of the following elements: (1) the terminal bronchiole, with its successive divisional branches, ducts, and alveolar sacs; (2) the artery of the pulmonary system with all its different features as pointed out by Dexter; (3) the artery of the bronchial system; (4) the vessels of the papillary system, which tend to form venules; (5) the anastomosis between the two arterial systems and between them and the venous system; and (6) the lymph-collecting system.

APPRAISAL OF RESPIRATORY FUNCTION

In appraising respiratory function, consideration must be given to physiologic dead space, total pulmonary capacity, volume of circulating air, vital capacity, relation between inspiratory capacity and volume of expiratory reserve, relation between residual volume and residual functional capacity, relation between residual volume and total capacity, relation between vital capacity and time, minute ventilation and air-action gradient, maximum respiratory capacity, optimum frequency, reserve ventilating capacity, lung resistance, and so on. Alveolar-capillary diffusion of gases, blood irrigation of the alveole, and circulatory dynamics of emphysema were discussed. The general pathogenic hypotheses of the disease were reviewed, with emphasis on the thoracogenic and bronchogenic pathology, especially on the theory of senile breakdown of lung structures—the key to the whole concept of senile emphysema.

The contrast which exists between a destructive lesion, such as that seen in genuine senile emphysema, and respiratory function preserved at a good level, can be explained by the fact that respiratory function, being indispensable to life, is safeguarded by a functional reserve of air, which must be widely distributed judging by the millions of alveoles in the normal lung. The functional reserve decreases in proportion to the value of the destroyed parenchyma, and the aged person's need for oxygen decreases synchronously with the senile decay of all organs and systems.

CLINICAL STUDY

In the clinical study of senile emphysema, Beltran Baguena used 100 complete case histories. The clinical selection of cases was based on presence of: kyphosis or

kyphoscoliosis; tympanic percussion sounds, especially with an enlarged heart; noticeable diminution or uniform disappearance of vesicular murmur; radiologic hyperclarity of all or the lower parts of the lung; and other bronchial sounds.

Four general emphysema groups were found: a first group with clinically masked senile emphysema, which is clinically asymptomatic and which may continue for a long period; a second group whose respiratory history is still recent; a third group of patients seriously ill with bronchogenic emphysema and a slightly less degree of thoracogenic emphysema; and a fourth group in which the first signs appear on entering the presenile state.

In the third group, which is the most interesting clinically, study was made of the infectious factor, asthmatic factor, coronary factor, and other doubtful factors. The fourth group is formed by what might be called "emphysematogenous" forms of bronchitis, since, eventually, these lead to senile emphysema.

SYMPTOMS

Symptoms of senile emphysema include coughing and its complications, such as the retention of expectoration from senile deadening of the tussive reflex, expectoration, and dyspnea in all its inspiratory and expiratory forms. There are some spondylogenic syndromes, or diseases of the spine, which are conducive to emphysema. Even without any sign of kyphotic deformation or spinal maturation, there may exist a dynamic or functional spinal rigidity capable, because of minimal lesions in the spine or its neighborhood, of bringing on pulmonary phenomena.

Beltran Baguena has his own criterion, different from most authors, regarding the cardiorespiratory syndromes of emphysema. In the first place, emphysema patients show a certain drop in general blood pressure, which he attributes to (1) anoxemic anoxia and a possible imbalance of blood volumes between the arterial and venous sectors of the systemic circulation; (2) the still unproved pressive balance between the two circulations, which may explain the drop in pressure in the systemic circulation as a means of facilitating drainage and the drop in pulmonary hypertension; and (3) the depression in the systolic arterial tension in the inspiratory phase. The hypertension of the pulmonary artery and the forced increase of diastolic depletion of the right ventricle might not permanently interfere with the simultaneous repletion of the cavity of the other ventricle, thus lessening the volume-contraction day by day, and eventually causing an adjustment of the periphery to the constant diminution of the output of the left ventricle.

COR PULMONALE

Chronic cor pulmonale can be divided into two syndromes: genuine cor pulmonale and emphysematous pseudocardiopathy. In genuine cor pulmonale, the high venous blood pressure is at first precardiac and intrathoracic, and later may become general throughout the vascular system containing venous blood. In emphysematous pseudocardiopathy, the high venous blood pressure is always retrocardiac and extrathoracic. Beltran Baguena suggests that (1) right cardiopathy occurs on a smaller scale than was previously believed, as a pulmonary process affecting only the right ventricle; (2) chronic cor pulmonale may imply transformation of a left cardiopathy, when it has not been previously identified in a right cardiopathy; (3) cor pulmonale may be rare, but it may also occur from other causes; and (4) appearance of inflow stasis does not mean that cor pulmonale is present, if it is accompanied by intrathoracic hypertension. The initial dyspnea in cor pulmonale is made patent clinically when the adaptation mechan-

isms of the right heart break down, and the entire syndrome of venous stasis appears.

He discussed the curative and prophylactic treatment of bronchitis, including use of antibiotics, chemotherapy, vaccine therapy, and so on; the treatment of the thoracogenic factor of emphysema, including use of the different external compression mechanisms, pneumoperitoneum, and modifiers of respiratory pressure; and the treatment of the complications of emphysema, including use of ACTH and cortisone.

Senile Cardiopathology

The second theme of the Congress, that of senile cardiopathology, was entrusted to Dr. F. Vega Diaz, chief of the Cardiology Department of the National Institute of Industrial Medicine and the Geriatric Department of the Institute of Medical Pathology in Madrid.

FUNCTIONAL TESTING

He believes that the limits of cardiovascular normalcy in old age are reached when the various functional tests show changes in the capacity to adapt to demands. These tests must show: (1) whether the cardiovascular system is functionally able to meet vital needs and emergencies; (2) whether its neurologic regulation is effective at all levels; and (3) when, in each case, variations of normal function begin or when they become pathologic. When administered properly, tests of the habitual work of the organs—cardiovascular constants during fasting, digestion, sleep, exertion, and emotion—are better than more complicated tests.

SYMPTOMS

The transition from a normal to a pathologic senile condition is marked by appearance of symptoms and occurs (1) directly, by intensification of senile hypofunction, both general and cardiovascular; and (2) indirectly, through a given cardiovascular disease and through stress. There may be a series of minimal syndromes, many of them subclinical or preclinical states, in which various parts of the regulating mechanisms appear disordered, mixed, or polyfacetic, and which are habitually overlooked by the general clinician.

Under the general title of "senile cardiodystrophy," may be grouped the various forms of clinical pathology found in the aged heart, under headings corresponding to the senile conditions characterized physiopathologically by (1) less capacity for physiologic adaptation to requirements of daily life; (2) less good recovery after effort, greater slowness, and more trouble with accidents; (3) a different response to drugs; (4) vasomotor action of different direction and less vigor; (5) a definite tendency to functional breakdown; and (6) the effect of the whole pathology of earlier life.

Anatomically, cardiac pathology is characterized by: (1) greater or lesser atrophy and pigmented myocardial degeneration; (2) diminished vascularization of the tissues, or arteriosclerotic ischemia; (3) appearance of calcification, fibrosis, and so on; and (4) the presence of residual processes of past or present illnesses.

The clinical picture may be one of senile involution, with brown atrophy, calcification of the annulus fibrosus, and coronary and cerebral sclerosis; or one of senility superimposed on a previous cardiac pathology, hypertensions, lues, or atherosclerosis; or one in which senile cardiac dystrophy appears precipitated or exacerbated by the presence of extracardiovascular diseases with repercussions in the circulation.

CARDIAC DYSTROPHY

Senile cardiac dystrophy may have any of the following characteristics: (1) it may be asymptomatic and nearly always

overlooked; (2) it may be symptomatic and rapidly become grave; (3) it may be confused and give rise to different interpretations; (4) its onset and course may be subclinical, latent, and insidious; and (5) its symptomatology may be brought on by insignificant causes.

The cardiac failure of senile cardiodystrophy was discussed, with mention of clinical forms of varied intensity and appearance, the habitual causes of onsets, conditioning and aggravating states and processes, and symptomatology. Symptoms include dyspnea, passive congestion of the lungs, cyanosis, hepatomegaly, diurnal oliguria with nocturnal polyuria in absence of prostate adenomas, edemas, effusions of the serous membranes, various arrhythmias, and so on.

In treatment of senile heart failure, allowance must be made for manifestations of senility as shown in the different response to therapeutics, such as digitalis, quinidine, mercurial drugs, blood letting, and resins, and for complicating factors, such as concurrent disease in other systems, flatulence, and shock.

The true senile type of atherosclerosis has a slow and asymptomatic course and is appreciable clinically only when the hyperplasia of the tunica intima produces stenosis of the lumen or when atherosclerosis becomes imbricated.

REGIONAL DISTURBANCE

Regional circulatory disturbance results from changes in the vascular physiology caused by loss of elasticity and lessened vasomotor tone, with their local hemodynamic consequences. In deficiency cases, the vascular caliber is affected by territorial intermittent breakdown. Obstruction is marked by necrosis, atrophy, and so on. There may be a first phase of anomalous circulation, a second phase of deficient circulation, and a malignant phase of obstructed circulation, occurring in all the arterial territories, sometimes simultaneously, though in varying degrees. The clinical signs are different in these different phases, since they belong to distinct substrata, although all of them are evolutive. A diagnosis of arteriosclerosis should not be made merely because the patient is old. Errors in interpretation of syndromes must be avoided in the anomalous and deficient circulation stages, since symptoms usually correspond to the region affected and may cause the true pathology to pass unnoticed. Since this is a disease which runs its course with multiple localizations, the fact that phenomena crop up in one part of the body does not exclude the possibility of arteriosclerosis in others.

FAILURE OF CORONARY CIRCULATION

It is suggested that the term "failure of coronary circulation" be substituted for that of "coronary failure." The distinguishing of three forms of the disease—angina pectoris, coronary failure, and infarction—is felt to be unwarranted, since the organic disease is the same in all cases and the only difference is in the phase of development.

Symptoms of the anomalous circulation phase include pseudoanginous phenomena, flatulence, distension, and colics; of the deficient circulation phase, angina pectoris; and of the obstructed phase, infarct. He spoke of shock of coronary origin and on its biologic manifestations.

Treatment of senile myocardial infarct should be based on these principles: (1) therapeutics in keeping with the condition and stage of development in each case; (2) handling of the symptom or symptoms; (3) lessening of the heart's work; (4) awareness of the fact that an old person's heart is already a failing heart; (5) administration of coronary dilators, overlapping the action of successive doses in such a way as to maintain a constant maximum of local efficacy; and (6) correction of shock conditions, and avoidance of complications.

Editorial

Rehabilitation—a vital part of civil defense

THE RECENT CIVIL DEFENSE TEST, Operation Alert, renewed our awareness that mobilization would restrict health services to the bare core of minimum necessity. At the same time, national survival could be contingent upon the ability of people to work, or, if unable to work, to carry out the activities of daily living independently or with minimum assistance from those who can work. Yet today we see on every hand thousands of patients, particularly older persons, who have been allowed to become unnecessarily dependent. These patients are absorbing the services of a vast corps of health personnel who could be freed for other essential services if some new approaches were made to patient care. What is needed is emphasis in all medical care plans on the maintenance and, if necessary, the redevelopment of function.

In line with this thinking, problems in the care of the long-term sick have been reevaluated by a number of national bodies in the past year. This spring the Commission on Chronic Illness completed its recommendations on the many facets of long-term care and they are published in the June issue of the *Chronic Illness Newsletter*. The annual forum of the National Health Council devoted one session to these problems and the Office of Vocational Rehabilitation, Department of Health, Education, and Welfare, has recently published an exhaustive survey of programs and needed services for homebound handicapped individuals.

Recently the Health Resources Advisory Committee of the Office of Defense Mobilization issued a report by its Subcommittee on Hospital Services on the necessary action to reduce personnel requirements for the care of long-term patients. In this report, long-term patients are pictured as needing individualized rehabilitation services and reevaluation services at appropriate intervals. Long-term patients, however, fall into two quite distinct categories with respect to their need for other institutional services. One group is the chronically ill whose distinguishing characteristic is their continuing need for ready access to the same sort of therapeutic services which are required by short-term patients. The second group we may term the chronically disabled or persons with physical disabilities resulting from acute disease or trauma. This latter group does not need continuing intensive diagnostic and therapeutic services after maximum benefit from therapy, but only medical services on occasion, such as all of us require.

Currently in New York an independent survey is being made to determine what number of long-term patients now

occupying beds in the municipal hospitals of the City of New York might be transferred to their own homes, convalescent facilities, and nursing homes. This study grew out of a research project financed by the New York Foundation at Goldwater Memorial Hospital, in which it was found that, of 95 unselected custodial cases evaluated from the medical, social, psychologic, and emotional viewpoints, only 7 were felt to be in need of continued hospitalization and 2 of these were considered questionable.

Recognition of these findings indicated that possibly sizable proportions of the long-term custodial cases in New York hospitals could be transferred to non-hospital facilities, where they could be maintained at much less cost to the city. If this proves to be the case, not only would there be important financial savings to the city, but the patients transferred would have an opportunity to lead more satisfying lives than is possible in a hospital. Unfortunately, all of us who are interested in health and welfare come in contact daily with patients now hospitalized who cannot be discharged from the hospital because there are no facilities capable of caring for them.

Somehow, we must come to understand, as individuals, as communities, and as a nation, that neglect of disability is more costly than an aggressive program of rehabilitation which restores people to lives of productivity and satisfaction.

In its deliberations, the Subcommittee on Hospital Services of the Health Resources Advisory Committee came to several conclusions. These were:

1. The kind of care that is most economical in terms of both money and personnel is the kind of care that returns the patient to his maximum performance as rapidly as possible.

2. Application of the foregoing principle requires that a dynamic philosophy of rehabilitation be paramount in the care of the patient at every stage of his illness.

3. Inefficient use of personnel results from providing care which is not properly adapted to patient's needs.

4. Providing more services – visiting nurse, physical therapy, occupational therapy, and homemaking services–to the patient in his own home is a far more effective means of reducing hospitalization than rigid rules requiring the transfer of patients under designated conditions

There are and can be no specific "blueprints" on how each hospital should approach the objectives outlined above. Individual approaches by each institution must be developed according to individual situations. Underlying any approach, however, there must be the recognition of the concept of rehabilitation by providing the variety of services that are necessary if the patient, regardless of his physical status, is to reach his maximum physical, social, emotional, and employment potentials.

HOWARD A. RUSK, M.D.
Chairman, Health Resources Advisory Committee
Office of Defense Mobilization

A beautiful discourse on old age

WE ARE indebted to Dr. Leonell C. Strong, the anatomist, writing in the Yale Journal of Biology and Medicine for November 1952, for a reprinting of some unusually fine comments on old age, published first in 1620 by Owen Feltham, who, strangely enough, was then a youth of 18!

Writing in a book entitled *Resolves, Divine, Morall and Political,* he included an essay on "The Misery of Being Old and Ignorant." The last two words are the important ones because, as will be seen, Feltham had the sage idea that if the old man has wisdom and learning he can always amuse himself, and he can be

good company to his friends. If he is stupid and unlearned he will be a bore to himself and others.

Following is a brief resumé of the essay in modern spelling, as it was prepared by Dr. Strong.

Since old age is not only a congregation of diseases, but even a disease of itself, and that incurable save by death, the best thing next to a remedy is an abatement of the malady. When infirmities are grown habitual and remediless, all we can do is to give them some respite and a little alleviation, that we may be less sensible of the smart and sting they smite us with. . . . And what thing is there that can so qualify (a man) against the breaches and decays that age make in him, as Knowledge, as study and meditation? With this, he can feast at home alone, and in his closet put himself into whatever company that best shall please him, with youth's vigour, age's gravity, or beauties' pleasantness, as he likes. It abates the tediousness of decrepit age, and by the divine raptures of contemplation it beguiles the weariness of the pillow and chair. It makes him not unpleasing to the young, reverenced by age, and beloved of all. A grey head with a wise mind enriched by learning is a treasury of grave precepts, experience, and wisdom. He that can read and meditate need not think the evening long or life tedious. It is at all times employment fit for a man.

But ignorant old age is the worst picture that Time can draw of man. 'Tis a barren vine in autumn, a map of mental corporeal weakness, not pleasing to others but a burden to himself. His ignorance and imbecility condemn him to idleness; which to the active soul is more irksome than any employment. What can he do when strength of limbs shall fail and the gust of pleasure which helped him to misspend his youth, through time and languid age shall be blunted and dull? Abroad he cannot stir to partake the variation of the world; nor will others be fond of coming to him when they shall find nothing but a cadaverous man composed of diseases and complaints that for want of knowledge hath not discourse to keep reason company.

Doubtless, were it for nothing else, even for this is learning to be highly valued, that it makes a man his own companion without either the charge or the cumber of company. He needs neither be obliged to humour nor engaged to flatter. He may hear his author speak as far as he likes, and leave him when he does please, nor shall he be angry though he be not of his opinion.

Knowledge is the guide of youth, to manhood a companion and to old age a cordial and an antidote. If I die tomorrow, my life to-day will be somewhat the sweeter for Knowledge.

Some of this has a little the flavor of Sir Francis Bacon and some has a bit the sound of Sir Thomas Browne and the *Religio Medici*. One is reminded also of Dr. David Starr Jordan's remark that since a man must live with himself most of the time through the years, he had better early see to it that he so develops his mind that he will be good company for himself!

WALTER C. ALVAREZ, M.D.

Isolation in senescence

ACCORDING TO JACK WEINBERG, who spoke recently before the annual meeting of the National Association for Mental Health, the great tragedy of later life is the feeling of being left alone in a hostile and rejecting world. Dr. Weinberg, who is assistant professor in psychiatry at the University of Illinois, said that the primary needs of the aged—the needs for security and for the interest and affection of other persons—are those of persons of any age period. The special dangers of the senescent are the fear of decline in physical health and ability; the loss of erotic values, which means lessened attractiveness to the other sex; the loss of supporting persons in the family and among friends; the encountering of social and economic discriminations against the aged; and the gradual loss in flexibility and elasticity of the adaptive mechanisms of the person.

As we all know, all this leads to the gradual isolation of the aged person from his environment. There is an increasing sense of aloneness which in many cases brings tragedy.

WALTER C. ALVAREZ, M.D.

Digests

FROM CURRENT LITERATURE

Some Differential Features Concerned with Space-Consuming Intracranial Lesions in the Elderly

G. HORRAX, and G. R. NOWLIS. S. Clin. North America 35: 873-879, 1955.

The fact that cerebral arteriosclerosis and vascular accident are the commonest causes of neurologic disorder in the elderly should not prevent the physician from recognizing correctible lesions, such as hematomas and neoplasms. Typically, the patient's condition improves following a thrombosis or embolism. Therefore, when neurologic signs do not improve, or become worse, the existence of an expanding tumor should be investigated.

Often the patient is unable to remember the head trauma that produced the unilateral or bilateral hematomas later found at operation. Even a very mild blow on the head, or a hard fall on the buttocks may serve as the cause. Only bilateral burr holes can exclude the subdural blood clot with finality. Brain tumors in the aged are often curable. Elevation of spinal fluid pressure or protein, pineal shift, bony exostoses and erosions on the roentgenogram, and arteriographic findings may reveal the operable brain tumor, and the patient is kept from unnecessary invalidism and premature death.

Craniopharyngioma (Pituitary Adamantinona) in Patients More Than 60 Years of Age

J. A. WITT, C. S. MAC CARTY, and F. R. KEATING JR. J. Neurosurg. 12: 354-360, 1955.

Occurrence of craniopharyngioma is reported in 2 patients 70 and 63 years of age. Only 5 other instances of this tumor in persons over 60 have been reported.

Both patients complained of failing vision and were found to have large visual field defects. Roentgenograms of the skull disclosed decalcification of the sella tucica in both patients. Neither patient exhibited symptoms or signs of pituitary or adrenal insufficiency.

Cortisone, 200 mg., was given intramuscularly forty-eight, twenty-four, and two hours preoperatively. Subtotal removal of the tumors was performed to avoid injury to the hypothalamus and carotid arteries. In the immediate postoperative period, one patient developed mild diabetes insipidus, but neither patient showed evidence of anterior pituitary insufficiency. Visual fields showed great improvement. However, within two months after surgery, both patients demonstrated adrenal insufficiency and were placed on maintenance cortisone therapy. No sign of recurrence of tumor was present ten and twenty months after surgery.

Evaluation of thyroid, adrenal, and gonadal function should be done in all patients with pituitary tumors. Preoperative adrenal substitution therapy should be employed whether or not there is evidence of pituitary or adrenal insufficiency. This treatment provides the patient depots of adrenal steroid which may be drawn upon during and after operation.

Chronic Pulmonary Emphysema

R. A. GOODWIN, JR. J. Tennessee M.A. 48: 215-218, 1955.

Pulmonary emphysema is a common, although often unrecognized, cause of heart failure in the elderly. Most chronic diseases of the lung, including bronchitis, bronchial asthma, bronchiectasis, granulomatous diseases, and pneumoconioses, eventually lead to pulmonary emphysema.

Since incompletely treated acute lower respiratory infections in childhood can become chronic, prolonged antibiotic treatment is recommended for children. After a chronic condition is established, removing inhalant irritants such as dust, cold air, and tobacco smoke, offers relief. Infected teeth and acute bronchitis should be vigorously treated with antibiotics.

Treatment of bronchiolar obstruction may include, in addition to antibiotics, bronchodilators, expectorants, postural drainage, breathing exercises, and detergent mist. Cortisone therapy should be used cautiously.

If oxygen therapy is to be used for lung failure, the patient should be carefully watched for carbon dioxide retention and respiratory acidosis. Narcotics and sedatives should not be given.

Cardiac insufficiency can be treated with digitalization and mercurial diuretics. When heart failure is caused by pulmonary disease, uncontrolled use of oxygen, narcotics, and sedatives can be disastrous.

Hospitalization of Men at Ages Sixty and Over

Statist. Bull. Metrop. Life Insur. Co. 36: 1-3, 1955.

One out of 7 men over 60 is hospitalized during the year, and 1 out of 6 men at age 75 and over, according to the Statistical Bulletin of the Metropolitan Life Insurance Company. The data concern employees and retired personnel protected under the company's group insurance program.

Two-fifths of the patients undergo surgery, for which the average hospital stay is a fraction over fourteen days, and in nonsurgical cases, a little over twenty days.

The following distribution of diseases accounts for a total of 445 cases without surgery: heart disease, 127 cases; gastrointestinal disease, 63; circulatory system, 34; central nervous system, 32; genitourinary disease, 30; respiratory system, 30; malignant neoplasms, 20; accidents, 19; arthritis and rheumatism, 18; and psychoneurotic disorders, 17.

The average hospital stay was longest for psychoneurotic disorders—about one hundred and twenty-eight days. Diseases of the central nervous system and malignant neoplasms required an average hospital stay of approximately thirty-nine and forty days respectively. All other conditions had average hospitalization periods of one to three weeks.

Masked and Obvious Vitamin Deficiency States in Older Age

T. E. MACHELLA. Pennsylvania M. J. 58: 587-590, 1955.

Vitamin supplements may alter or delay some processes of aging. Although some evidence suggests that the process of aging predisposes to a biochemical avitaminosis, the daily requirements of the elderly should be considered the same as the following requirements for younger adults: thiamine, 0.5 mg. per 1000 calories, with a minimum of 1 mg.; riboflavin, 1.6 mg. for men and 1.4 mg. for women; nicotinic acid, 5 mg. per 1000 calories, or 15 to 20 mg.; pantothenic acid, 20 mg.; pyridoxine, 2 mg.; B_{12}, 2 to 4 micrograms; folic acid, 1.5 mg.; C (ascorbic acid), 70 to 75 mg.; A, 5000 units; D, supplement of 400 units for anyone deprived of sunlight, or in a cast; and K, supplements necessary for patients not eating, or receiving drugs which alter the colon's bacterial flora.

Vitamin deficiencies in the elderly may result from poor eating habits caused by inadequate teeth, limited finances, lack of interest, chronic gastritis, or chronic alcoholism. Impaired gastric, pancreatic, and hepatic function during aging may also cause nutritional deficiencies.

The Clinical Effects of Alpha-(2-piperidyl)-Benzhydrol Hydrochloride (Meratran) in States of Inactivity in Elderly Psychiatric Patients

W. FORSTER, L. HENDERSON, and S. SCHULTZ. Canad. M. A. J. 72: 678-681, 1955.

In a study of the clinical effects of Meratran, "MRD-108," in a series of 23 psychiatric patients 50 to 80 years of age, it was observed that the drug is a powerful stimulant with a central action and with euphorizing effect. The main criterion for the selection of patients was a state of inactivity.

No significant variations were found in red cell count, hemoglobin value, white cell count, cephalin flocculation and blood sugar. In the 3 patients who were studied by electroencephalograph, no differences in tracings were detected. The significant clinical findings were a definite increase in activity and a rise in pulse rate.

Those patients who were disoriented and given to purposeless behavior showed an increase of nondirected activity. Stereotyped movements remained stereotyped, but were wider, more frequent, and more rapidly repeated. Where the patient's personality was well preserved, the activity was directed. Once established, the hyperactivity continued throughout the course of treatment. In addition, an ashen color developed in a significant number of patients. The clinical findings do not appear to depend on the dosage of drug administered.

Dangers of Inactivity During Automobile Travel

A. SOFFER. Am. J. M. Sc. 229: 475-476, 1955.

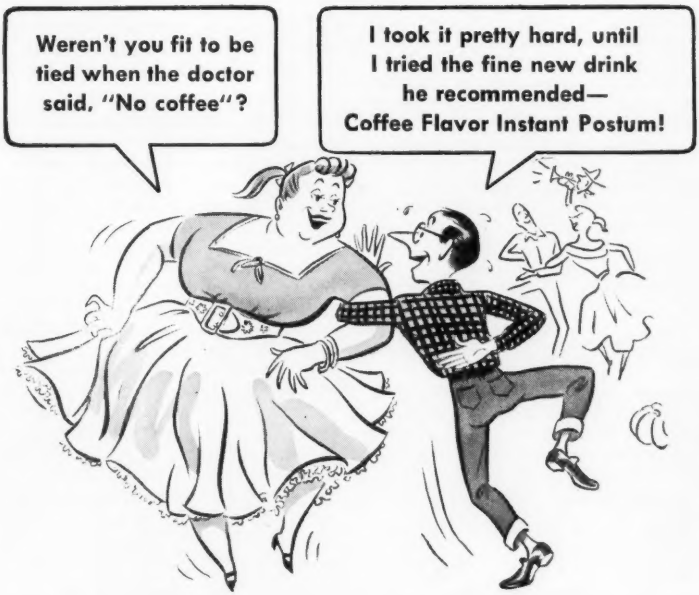
Inactivity during automobile travel can cause critical vascular accidents. A case is cited of a healthy 72-year-old woman who suffered grand mal convulsions three days after a sixty-eight hour bus trip.

A position that permits excess pooling of blood in the lower extremities prevents adequate venous return to the heart. Cerebral ischemia or venous thrombosis can result.

Travelers with lower extremity venous abnormalities should wear leg bindings during long trips. However, any healthy traveler should take the precaution of getting out of the car every few hours to move about. Passengers should move their legs frequently while riding, and massage them. The trip should allow for nightly sleeping in bed; reclining seats do not raise the feet high enough.

In the older age groups, edema is a warning sign. If leg bindings, massage, and periodic walking do not prevent edema, the trip must be interrupted for bed rest in the supine or minimal Trendelenburg position.

(Continued on page 42A)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Digests FROM CURRENT LITERATURE

(Continued from page 500)

Public Health Aspects of the Aging Population

M. ROE. Texas J. Med. 50: 593-595, 1954.

Direct application of public health practices can do much to advance the health and welfare of the aged.

Environmental conditions must be regulated to decrease accidents, one-third of which occur in the home. Prolonged heat waves are bad for the aged, as this group is most susceptible to heat cramps, heat exhaustion, and heat stroke. Air contamination must be avoided.

Tuberculosis and syphilis are more common than is usually expected in the older group, and call for case finding and early treatment. Diabetes should be looked for and adequately managed. The late effects of hypertension may be prevented by newer methods. Rheumatic heart disease, if treated or prevented in the young, would eliminate the complications occurring later in life.

Neoplasms increase in frequency as the population ages. Buccal cavity and pharyngeal cancers account for 42.4 per cent and carcinoma of the skin for 34.5 per cent of the neoplasms in those over 65. Both conditions can be detected with ease and are comparatively easy to treat.

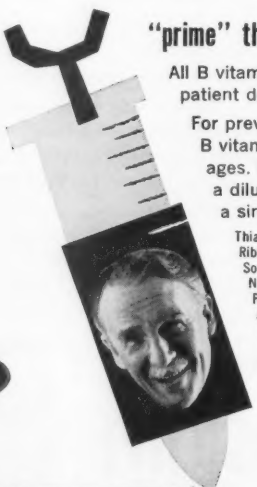
Malnutrition and vitamin deficiencies occur because of poor eating habits, food fads, ill fitting dentures, or lack of money for proper food. Adequate nutrition would correct debilities responsible for many degenerative processes.

La determinazione delle frazioni dell' acqua corporea nel vecchio "normale"

D. TORELLI, G. MARS, and M. REPACI. Giornale di Gerontologia 2: 287-296, 1954.

Evans blue sodium thiocyanate and NAAP (a derivative of Antipyrine) were used simultaneously, according to a special technic, to determine the total body water and its fractions in 21 elderly men and women with an average age of 68.7 years. They were all in good health, on standard diet, moderately active, and residents of an Institute for Old People in Milan.

The following average values were obtained: Plasma volume, 4.83 per cent of body weight; total blood volume, 8.28 per cent of body weight; extracellular fluid volume, 28.8 per cent of body weight; and total body fluid volume, 51 per cent of body weight. These were in contrast to average values of 3.98 per cent, 7.70 per cent, 24.5 per cent, and 53.5 per cent, obtained by the same technic in younger subjects with an average age of 38.8 years. A greater variability of values was observed in the old than in young subjects.



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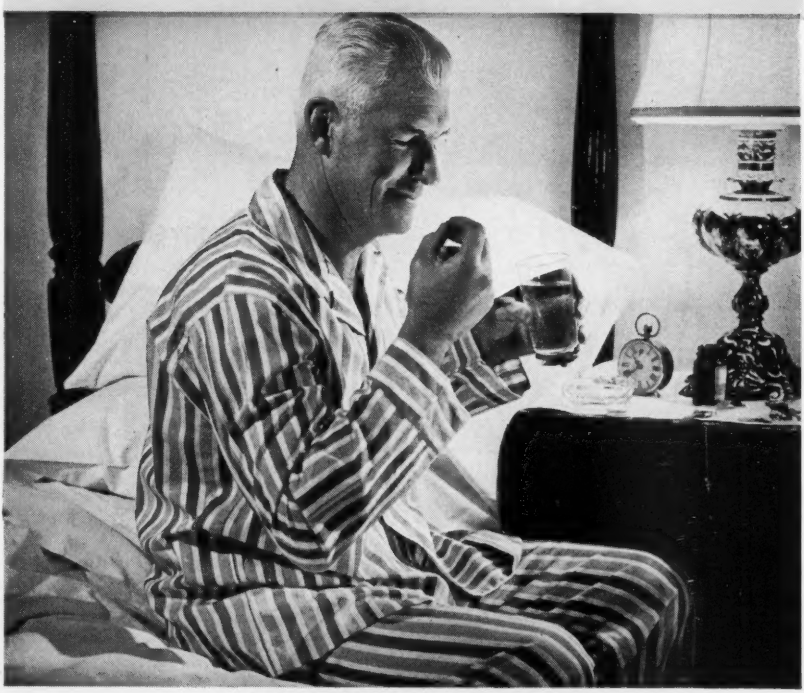

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References: 1. Mod. Med. 19:59, 1951. 2. West Virginia M. J. 49:292, 1953. 3. Pharmacology and Therapeutics, Phila., Lea & Febiger, 1954, p. 146. 4. Geriatrics 9:303, 1954.

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NUTRITION EDUCATION, as important as it is, perforce is slow in effecting public health gains; practical measures on a national scale, on the other hand, can effect such gains quickly.[1] An outstanding example of practical measures for helping to overcome malnutrition has been the broad commercial enrichment of white bread initiated in 1941.

By enrichment according to official regulations, white bread became an important food for supplying thiamine, riboflavin, niacin, and iron to the national dietary.[2] Supplementing enrichment in these nutrients, nonfat milk solids are added in amounts averaging 4 per cent (by weight) of the flour component.[3] Such enriched bread is valuable not only for its contained B vitamins and iron, but for its calcium[4] and its good quality protein[5] as well.

Mortality and morbidity of nutritional deficiency diseases have dropped markedly since the advent of commercial enriched bread. No stronger evidence can be cited than the virtual elimination of pellagra in our population in recent years.[1] In 1937, pellagra mortality was 2.5 per 100,000. By 1951 it had dropped to 0.1, representing an unprecedented low of 208 deaths reported in the entire country.

But a fall in mortality data reflects only in small measure the true improvement in public health resulting from the nutritional betterment of the national dietary.[1] Of greater concern is the vast number of people who, as a result, enjoy better health with increased capacity to work and enjoy life.

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4. Goddard, V. R., and Marshall, M. W.: The Calcium Content of Commercial White Bread, United States Department of Agriculture, Technical Bull. 1055, 1952.
5. Sherman, H. C.: Chemistry of Food and Nutrition, ed. 8, New York, The Macmillan Co., 1952, pp. 212, 599.

The nutritional statements made in this advertisement have been reviewed and found consistent with current medical opinion by the Council on Foods and Nutrition of the American Medical Association.

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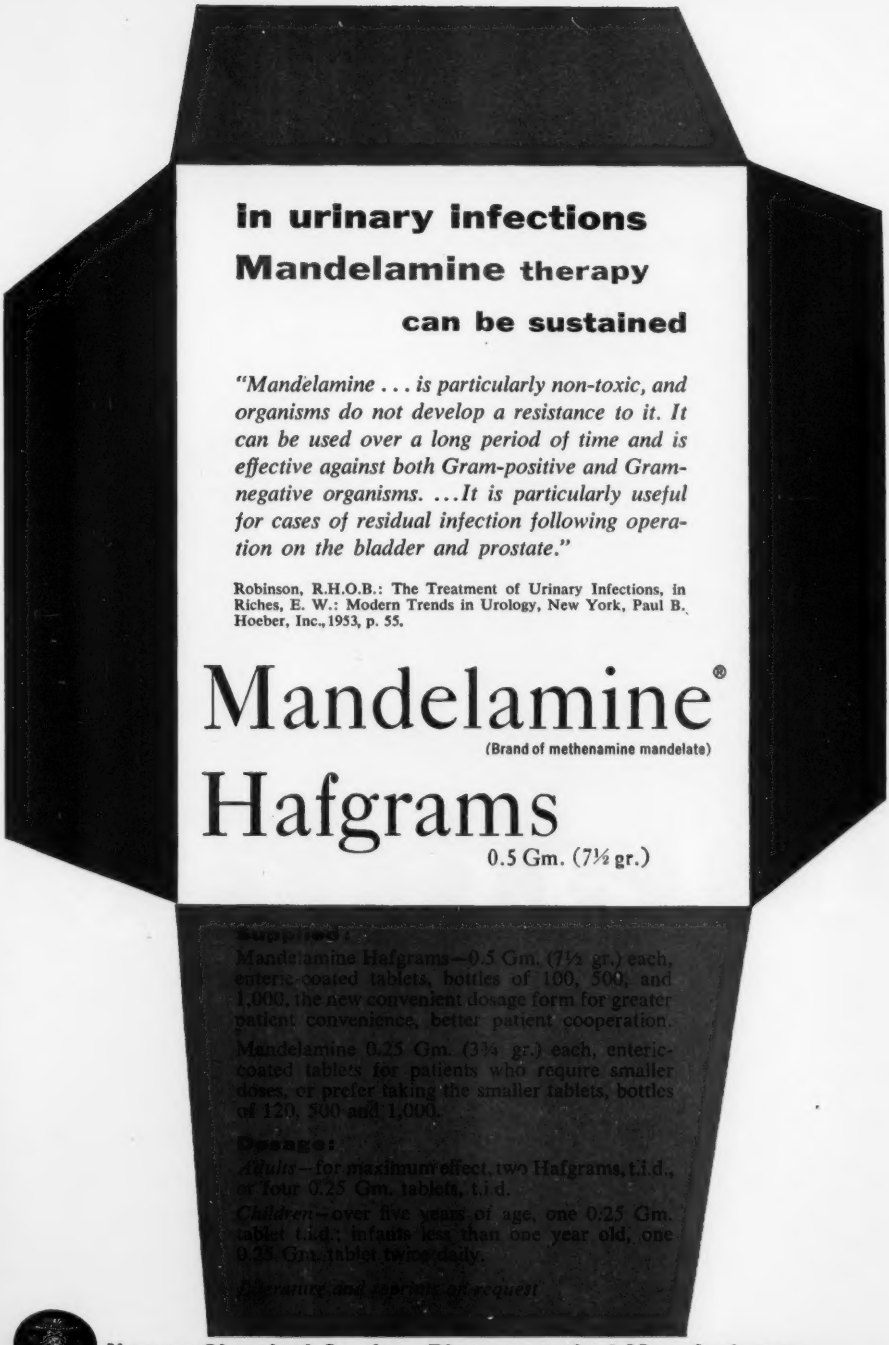
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Robinson, R.H.O.B.: The Treatment of Urinary Infections, in Riches, E. W.: Modern Trends in Urology, New York, Paul B. Hoeber, Inc., 1953, p. 55.
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Adults—for maximum effect, two Hafgrams, t.i.d., or four 0.25 Gm. tablets, t.i.d.
Children—over five years of age, one 0.25 Gm. tablet t.i.d.; infants less than one year old, one 0.25 Gm. tablet twice daily.
Literature and samples on request
NEPERA
Nepera Chemical Co., Inc., Pharmaceutical Manufacturers
Nepera Park, Yonkers 2, N. Y.
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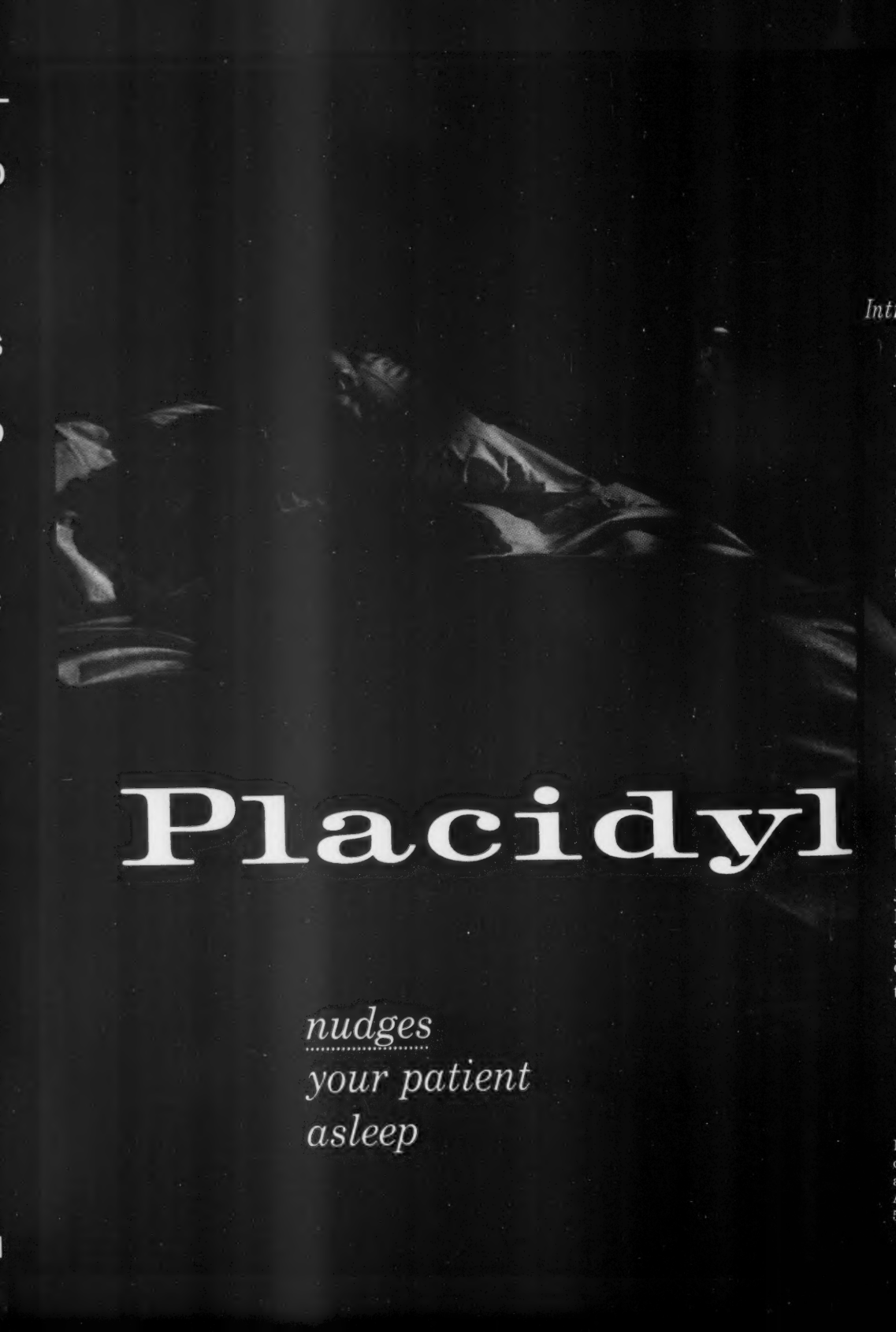
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nudges
your patient
asleep

Introducing Abbott's new non-barbiturate hypnotic

Placidyl offers a gentle new therapy for ordinary nervous insomnia.

It relaxes and calms the patient. Tranquil sleep comes within 15 to 30 minutes—should last all night.

Placidyl does not force patients into sleep; rather, it *induces* them to sleep naturally.

Hangover? Not a trace.

Even patients who take Placidyl after waking in the small hours rise clear-headed and refreshed.

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Profound hypnotic drugs remain justified for some insomnia patients. But for those whom you wish to give a safer, more gentle source of sleep . . . prescribe this mild new product. Abbott

Not related to the barbiturates, bromides, chloral hydrate, paraldehyde, etc. Available in 500 mg. capsules, bottles of 100. Adult dose for ordinary nervous insomnia 500 mg. at bedtime.

Clinical and biochemical consequences of

Vitamin Deficiencies

more serious in the aged[1]

When interest in food lags because of lowered physical activity, difficulty in mastication, or retarded digestive activity—*watch the intake of water-soluble vitamins!*

Allbee with C 'Robins' provides saturation dosage of the essential B vitamins,

plus 250 mg. vitamin C

—the highest ascorbic acid content of any water-soluble vitamin capsule.

1. Horwitt, M. K.: Jl. Am. Diet. Assn., 29:443, 1953.

. . . economical, too.

Allbee® with C Robins

Each capsule contains:

Thiamine hydrochloride	15 mg.
Riboflavin	10 mg.
Calcium pantothenate	10 mg.
Nicotinamide	50 mg.
Ascorbic Acid	250 mg.

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provides flexible oral penicillin therapy

MAJOR ADVANTAGES: Easy-to-give. Tablets dissolve readily in water, milk, fruit juices, infant formulas.

Six dosage strengths of PENALEV give you true flexibility of dosage wherever oral penicillin is indicated. Side reactions are less frequent than with injections.

Supplied: Soluble *Tablets* of 50,000, 100,000, 200,000, 250,000, 500,000 or 1,000,000 units of potassium penicillin G.

Ideally suited to pediatrics, prescription compounding, aerosol therapy.

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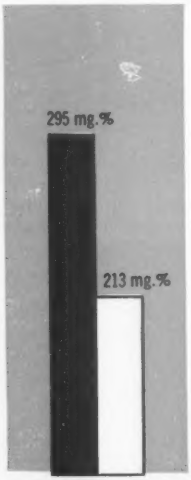

Reduces elevated blood cholesterol levels.[1,2]

Improves hypercholesteremic patients with cardiovascular disease and angina and those with postoperative biliary dyskinesia, both subjectively and symptomatically.[1]

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Polysorbate 80, Choline, Inositol—the new physio-chemical complex)

normalizes cholesterol metabolism

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Supplied: Bottles of 12 fluid oz.
Literature available.

1. *Albert, A., and Albert, M.: Texas State J. Med. 50:814 (Dec.) 1954.*
2. *Sherber, D.A., and Levites, M.M.: J.A.M.A. 152:682 (June 20) 1953.*

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Performance . . . Response

SALCORT*

Salcort performance stimulates a dependable response in arthritic conditions; early functional improvement and a sense of well being are significant. Smaller doses of salicylates and cortisone combined produce a therapeutic response equivalent to that of large doses of cortisone . . . side reactions are eliminated and continuous therapy is permitted. Salcort presents no withdrawal problems.

Each tablet contains:

Cortisone Acetate	2.5 mg.
Sodium Salicylate	0.3 Gm.
Aluminum Hydroxide Gel, dried	0.12 Gm.
Calcium Ascorbate (equivalent to 50 mg. Ascorbic Acid)	60 mg.
Calcium Carbonate	60 mg.

*U. S. Patent No. 2691662

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Book Reviews

Medical Problems of Old Age

A. N. EXTON-SMITH, M.D., 1955. Baltimore: Williams & Wilkins Co. 331 pages. $7.00.

An ever-increasing percentage of our population is attaining old age, and, as a corollary condition, geriatrics is assuming an ever greater importance.

The main responsibility for the medical care of the elderly falls on the general practitioner. This volume, then, is aimed at the family doctor. But there is much of interest in the book to specialists in various fields, particularly internal medicine, surgery, and urology.

Dr. Exton-Smith has a good background for a discussion of geriatrics, and his book gives a clear account of the diseases peculiar to the elderly, with explicit detail in the principles of geriatric care. Attention to these details will go a long way to make the lives of the ailing elderly more satisfying and possibly more useful. The book is well written and should appeal to many practitioners of medicine. It is printed in admirable fashion and contains a detailed index.

REUBEN ERICKSON, M.D.
Minneapolis, Minnesota

Geriatric Anesthesia

PAUL H. LORHAN, M.D., 1955. Springfield: Charles C. Thomas. 90 pages. $3.25.

This small monograph is one of an extensive list published as "American Lecture Series." After an introductory chapter, the well known physiologic changes in the aged are reviewed briefly, followed by short chapters on preoperative preparation and surgical management. Preanesthetic medication, including the opiates, barbiturates, and belladonna group of drugs, and the various anesthetic agents are discussed, and finally a few pages are given to anesthetic and postoperative management. There are no illustrations and almost no mention of technics. Omitted are some of the latest methods employing hypotension, hypothermia, and the so-called tranquilizing drugs.

The author takes a very conservative approach to anesthesia in the aged, stressing light anesthesia and preanesthetic medication. The monograph would be improved with some discussion of technical management and a more complete bibliography. Its primary interest will be to interns and beginning residents in the specialty of anesthesia.

E. A. ROVENSTINE, M.D.
New York City

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The makers of Pepperidge Farm Bread believe in fresh natural ingredients for nutritionally valuable and taste-pleasing bread.

So the flour for our Whole Wheat Bread is stone-ground in our own grist mills—contains the wheat germ and all the natural goodness of the whole grain. And we use whole milk, sweet cream butter, yeast and unsulphured molasses to make our bread.

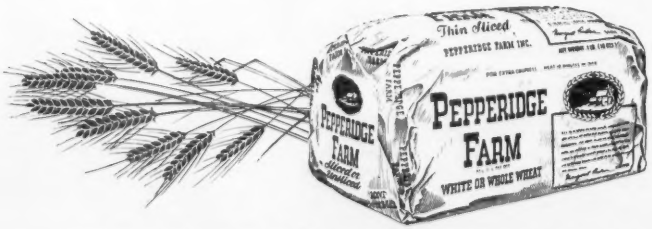
We offer White Bread, too—made with *unbleached* flour, dairy-fresh ingredients.

We suggest that Pepperidge Farm Bread deserves a place on your table.

For information about our special SALT-FREE Bread, please write to me.

Margaret Rudkin

DIRECTOR



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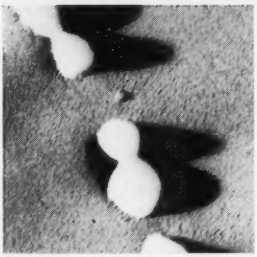
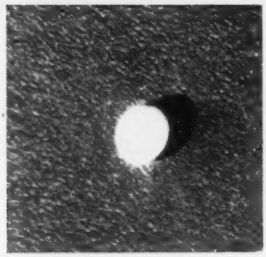
The organisms commonly involved in

Tenosynovitis



Str. pyogenes (8,500 X)



Staph. aureus (9,000 X)

Str. faecalis (10,000 X)

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MICROGRAPHS

***All* of them are included in the more than 30 organisms susceptible to broad-spectrum**

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100 mg. and 250 mg. capsules • 125 mg. and 250 mg./tsp. oral suspension (PANMYCIN Readimixed)
100 mg./cc. drops • 100 mg./2 cc. injection, intramuscular
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*TRADEMARK, REG. U. S. PAT. OFF. — THE UPJOHN BRAND OF TETRACYCLINE

Aphasia Rehabilitation: Manual and Work Book

MARTHA L. TAYLOR and MORTON MARKS, 1955. Institute of Physical Medicine and Rehabilitation, New York University, Bellevue Medical Center. 67 pages.

This book, although written for the use of a trained therapist, can be of great value to the wife of a man who has had a stroke and has been left without speech. First, there are a number of valuable suggestions on the handling of the patient from day to day, such as not tiring him or boring him, or getting annoyed when he breaks down and cries. One should not attempt to teach more than 5 or 6 words a day. Directions to the patient should be short and simple, and unnecessary words omitted. The patient whose right hand is paralyzed should be encouraged to try to use his left hand until the other one will work better. The teacher must be patient and often repeat instructions.

This book consists mainly of pictures of common objects such as a book, clock, key, or pen, with the corresponding words in very large print. These are to be cut out and shown to the patient, who must learn to match the words with the appropriate picture.

WALTER C. ALVAREZ, M.D.

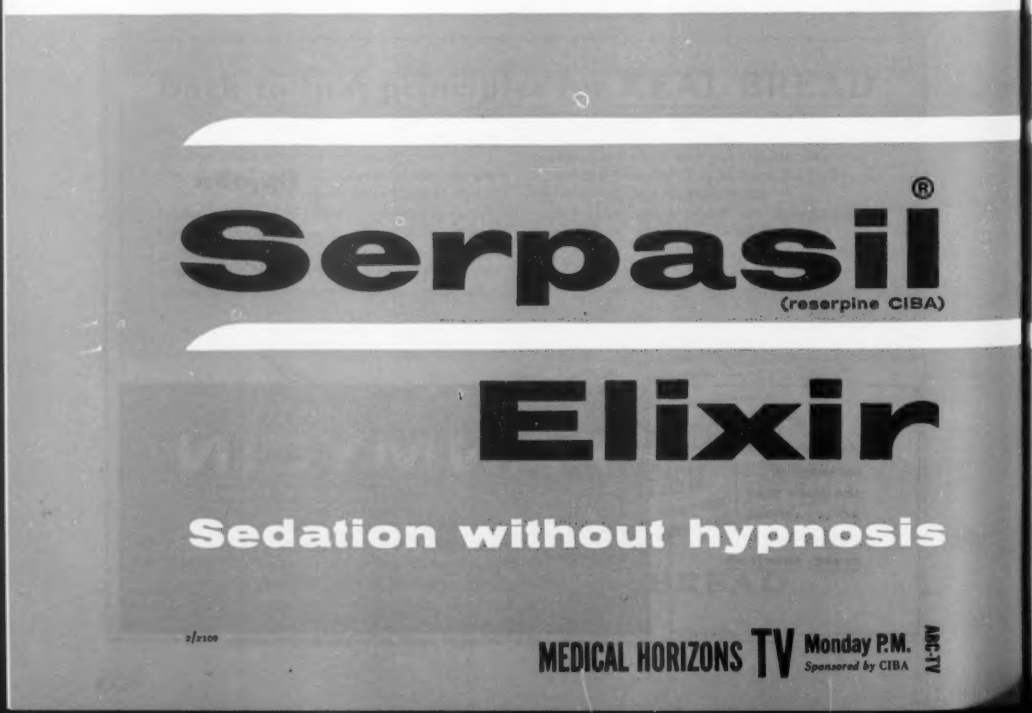
Ageing—General Aspects. Volume I. Ciba Foundation Colloquia on Ageing

Edited by G. E. W. WOLSTENHOLME and MARGARET P. CAMERON for the Ciba Foundation, 1955. Boston: Little, Brown and Co. 255 pages, 38 illustrations. $6.75.

This is the proceedings of the First Colloquium on Ageing, sponsored by the Ciba Foundation of London, and held there in July 1954 at the time of the Third International Congress on Gerontology. Some 16 papers are included, with the informal discussions which followed each paper. Thirty-four scientists attended the meeting; almost all had something to say and several made noteworthy contributions.

As the title implies, the symposium was diffusely focused. "General aspects," as here applied, might be accurately translated into "miscellaneous facets." The subjects discussed range over a wide area. Included are attempts to define and measure senescence, mental aspects of aging, age changes in diffusion coefficients of human tissue membranes, the histochemistry of elastic tissue, neglected areas of research in nutrition as applied to gerontology, and a theory that too rapid maturation of children accelerates senescence.

The great majority of the papers and dis-



cussions are of interest to those involved in basic research into the biology of senescence. As such is the foundation of much of our present and future knowledge in geriatric medicine, the proceedings should interest practicing physicians, although there is little which has direct clinical significance at the moment. There is little truly new or original in either the papers or the discussions, which is typical of such international conferences.

EDWARD J. STIEGLITZ, M.D.
Washington, D. C.

Beyond the Germ Theory

IAGO GALDSTON, M.D., editor, 1954. New York: Health Education Council. 182 pages. $4.00.

The fact that disease invariably arises from many interrelated and variable causative factors cannot be emphasized too much or reiterated too often. This little volume contains, in extended and integrated form, the material on the roles of deprivation and stress in health and disease, presented by nine highly competent authorities at the twelfth annual Eastern States Health Education Conference of the New York Academy of Medicine. In many respects it is a sequel volume to the significant work, *The Epidemiology of Health*, which is based upon the eleventh conference and which was reviewed in Geriatrics 10: 44, 1955.

The eleven chapters are arranged in four parts: The Dynamics of Deprivation and Stress, Nutritional Deprivation and Stress, Psychological Deprivation and Stress, and Social Stress and Deprivation. Much highly significant information is packed into this small book: it is almost all "meat." The exceptional condensation is achieved by superb editing, careful selection, and sharp focus on the basic thesis that illness derives from many interrelated sources. Only the chapter on nutritional maintenance in old age can be criticized as being superficial. The effects of many exogenous influences on the maintenance of failure of homeostasis and their relation to the genesis of disease are ably correlated.

This volume is worthy of studious reading by every physician, no matter what his specialty. It can be read with profit by educated laymen interested in health. It is recommended even more emphatically for students of medicine, nursing, biology, social work and social science, for perhaps their minds are more amenable to absorbing the broad thesis. The reviewer, himself long interested in widening the concepts of etiology, found the book most stimulating.

EDWARD J. STIEGLITZ, M.D.
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Activities and Announcements . .

Courses in Geriatrics

A number of courses in geriatric medicine have been slated for the coming fall and winter season. Listed according to title, place, length of course, and opening date they are:

Geriatrics George Washington University Hospital Washington 7, D. C.	October 6, 1955 2 hours weekly for 17 weeks
Geriatrics George Washington University Hospital	March 26, 1956 5 days
Problems of Aging New York Academy of Medicine	October 10, 1956 10 days
Symposium on Geriatric Medicine Hotel Roosevelt	November 11, 1955 2 days
Geriatrics New York University Post-Graduate Medical School	January 25, 1956 3 days

Coming Meetings

New York's first *Governor's Conference on the Problems of the Aging* will be held in Albany, October 18 to 20. Attendance, which is by invitation, will be limited to approximately 200 state leaders, lay and technical, and will work through 11 subcommittees.

The Department of Physical Medicine and Rehabilitation of the *New York Medical College* will present a two-day conference on "The Practice of Medical Rehabilitation—Home, Office and Hospital Procedures" on October 27 and 28 at the New York Medical College, Metropolitan Hospital, and Bird S. Coler Hospital and Home.

The Home for the Jewish Aged, 5301 Old York Road, Philadelphia 41, will sponsor the first annual *Medical Symposium on Clinical Aspects of the Aging Process* on October 23. The program is divided into three sections of neurology and psychiatry, nutrition, and cardiology. All interested physicians are cordially invited to attend.

(Continued on page 58A)

HELPFUL HINTS

Coffee Provides Excellent Vehicle for Constipation Corrective

Dear Doctor:

Many elderly patients have found that Borcherdt's Malt Soup Extract stirred into coffee provides an effective constipation corrective and, at the same time, sufficient sweetening for their coffee.

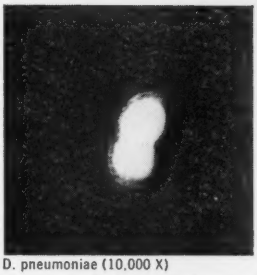
The usual dose of Malt Soup Extract is 2 tablespoonfuls in the morning and 2 tablespoonfuls at bedtime. It may be taken in coffee at breakfast and at dinner, or in milk at bedtime.

Stanley Olson

Stanley Olson
BORCHERDT MALT EXTRACT CO.

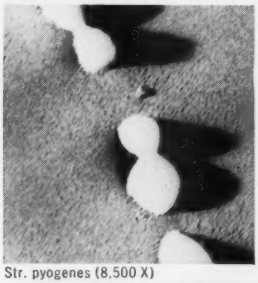
The organisms commonly involved in

Laryngitis



D. pneumoniae (10,000 X)

K. pneumoniae (Friedlander's) (13,000 X)



Str. pyogenes (8,500 X)

H. influenzae (16,000 X)

Staph. aureus (9,000 X)

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***All* of them are included in the more than 30 organisms susceptible to broad-spectrum**

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*TRADEMARK, REG. U. S. PAT. OFF.—THE UPJOHN BRAND OF TETRACYCLINE

Activities and Announcements . . .

(Continued from page 56A)

The eighth annual scientific meeting of the *Gerontological Society, Inc.*, will be held at the Sheraton-Belvedere Hotel, Baltimore, October 27 through 29. Chairman of the program committee is F. D. Zeman, M.D.

The ninth annual meeting of the *American Society for the Study of Arteriosclerosis* will be held November 6 and 7 at the Sheraton Hotel, Chicago.

•

Dr. Leake Assumes New Post

Chauncey D. Leake, Ph.D., executive director, University of Texas Medical Branch at Galveston, and associate editor of *Geriatrics*, has assumed a new position as assistant dean of the College of Medicine and professor of pharmacology at Ohio State University, Columbus.

•

Research in Arteriosclerosis

A gift of $150,000 has been made to New York Medical College, Flower and Fifth Avenue Hospitals to establish a laboratory for research in causes of and treatment for arteriosclerosis. The laboratory will be constructed on the fifth floor of the new building, contiguous with the present structure of Fifth Avenue between 105th and 106th streets, that the college is erecting as part of a ten-year expansion and development program. Dr. Harold B. Eiber has been named research director for the laboratory.

•

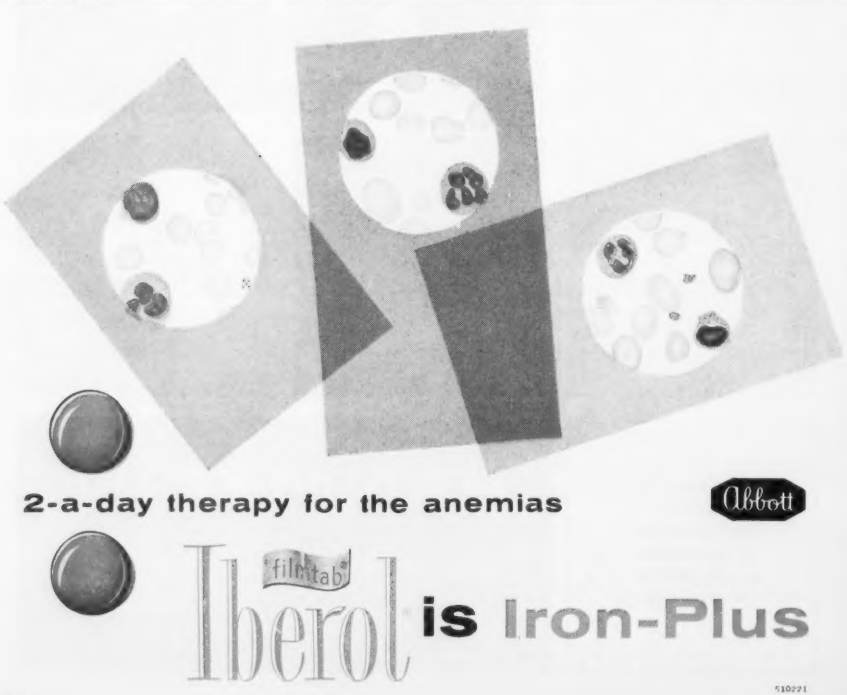
Cancer Research Building

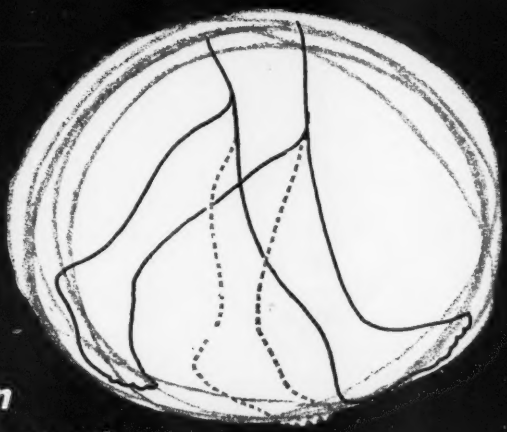
The Indiana University Medical Center in Indianapolis has added a cancer research building. Dr. Max W. Biggs of San Francisco will conduct research in cancer and allied fields under the sponsorship of the Indiana Cancer Society and the Stewart Trust Foundation of Washington, D. C., and will teach medical students, residents, fellows, and postgraduate students in specialty fields.

•

Elder Craftsmen Shop

A nonprofit Elder Craftsmen Shop will open this fall to display and sell wood carvings, ship models, doll houses, jewelry, leathercraft, and other articles made by New York citizens over 60. The shop is sponsored by the Welfare and Health Council of New York City, which has conducted the successful Hobby Show for Older Persons for the past nine years.





range of motion rapidly increased

in Rheumatoid Arthritis

Sterane*

the most potent anti-arthritic

3 to 5 times more potent than hydrocortisone or cortisone

notably free of major hormonal side effects such as edema due to sodium and water retention, hypopotassemia, and hypertension

seldom requires low-sodium diets or potassium supplements in patients without cardiac complications when given in usual therapeutic dosage

preliminary findings,[1] based on the measuring of pituitary ACTH suppression potency of various corticoids, appear to indicate that STERANE is 20% more potent than the cortisone analog, prednisone

supplied: in white, scored 5 mg. tablets in the familiar Pfizer oval shape

1. Forsham, P. H., et al.: Paper presented at First Internat. Conf. on Prednisone and Prednisolone, New York, N. Y., May 31-June 1, 1955.

*brand of prednisolone

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Make it easy for her to eat wisely with this friendly suggestion

Do you find it difficult to make your instructions about diet "stick"? The extra trouble it takes to fix special foods in small quantities is often the reason. Your patients will welcome the simple suggestion that they use strained and junior foods.

They'll especially welcome Strained and Junior *Beech-Nut* Foods because they *taste so good*. We take infinite pains at Beech-Nut to secure the freshest, finest fruits and vegetables and high quality meats. We prepare and process these good things to retain their natural flavors and nutrients.

Besides Strained and Junior Soups, Vegetables, Vegetable-meat combinations and Fruits, Beech-Nut offers dainty, nourishing, ready-to-eat desserts: Custard, Orange, and Pineapple Puddings. They're a happy way to tempt laggard appetities.

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highly potent
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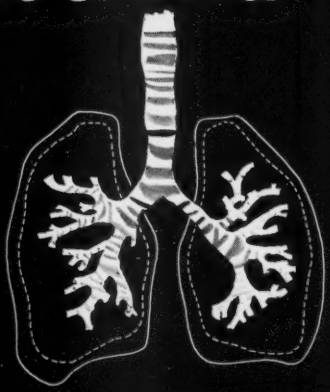
in Bronchial Asthma

for rapid increase

of vital capacity



3 to 5 times more potent than hydrocortisone or cortisone

notably free of major hormonal side effects such as edema due to sodium and water retention, hypopotassemia, and hypertension

seldom requires low-sodium diets or potassium supplements in patients without cardiac complications when given in usual therapeutic dosage

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Ovaltine in milk provides essential food elements that make it an ideal supplementary beverage with meals, for between meal snacks, and at bedtime.

Ovaltine in milk is easily digested and is delicious served either hot or cold. Its distinctive flavor appeals to both the young and the old.

Three servings daily (½ ounce of Ovaltine added to 8 fluid ounces of whole milk per serving) contain:

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Phosphorus	940 mg.	*Vitamin D	420 I.U.
*Iron	12 mg.	*Ascorbic acid	37.0 mg.
Copper	0.7 mg.	*Thiamine	1.2 mg.
Iodine	0.7 mg.	*Riboflavin	2.0 mg.
Fluorine	0.5 mg.	Pyridoxine	0.5 mg.
Cobalt	0.006 mg.	Vitamin B12	5.0 mcg.
Sodium	560 mg.	Pantothenic acid	3.0 mg.
Chlorine	900 mg.	*Niacin	6.7 mg.
Magnesium	120 mg.	Folic acid	0.05 mg.
Manganese	0.4 mg.	Choline	200 mg.
Potassium	1300 mg.	Biotin	0.03 mg.
Zinc	2.6 mg.	*PROTEIN	32 Gm.
		CARBOHYDRATE	65 Gm.
		FAT	30 Gm.

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reduces swelling
and inflammation
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Allergic
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the most potent anti-inflammatory hormone

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3 to 5 times more potent than hydrocortisone or cortisone

notably free of major hormonal side effects such as edema due to sodium and water retention, hypopotassemia, and hypertension

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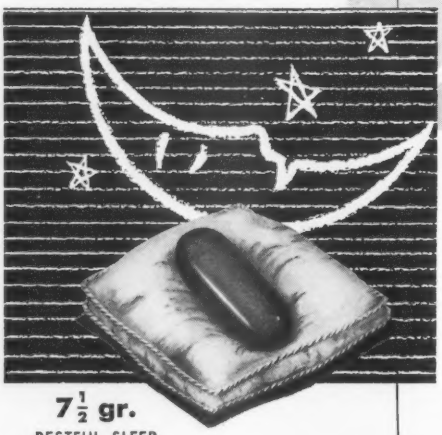

7½ gr.
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a circulatory and respiratory stimulant . . .

Coramine®

ORAL SOLUTION

(nikethamide CIBA)

Clinical experience over many years has shown that Coramine Oral Solution is useful as a circulatory and respiratory stimulant for asthenic or elderly patients. It has been reported that Coramine Oral Solution may be beneficial in patients with coronary occlusion, in whom it appears to improve collateral circulation in the infarcted area and to stimulate the respiratory center.[1] Being noncumulative and having low toxicity, Coramine Oral Solution is suitable for prolonged treatment without danger of habituation developing. *Dosage:* ½ to 1 teaspoonful (2 to 4 ml.) 2 or 3 times a day—diluted, if desired, with water.

SUPPLIED: Coramine Oral Solution, a 25% aqueous solution of nikethamide; bottles of 1 and 3 fluid oz. and 1 pint. Also for intravenous or intramuscular use: Ampuls, 1.5 ml. and 5 ml.; multiple-dose vials, 20 ml.

1. Carey, L. S.: Delaware M. J. 21: 229 (Oct.) 1949.

CIBA
SUMMIT, N. J.

2/2092

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NOW...

a *real* advance in ACTH therapy

CORTROPHIN-ZINC

AN ORGANON DEVELOPMENT

The complete physiologic action of ACTH enhanced, prolonged, and with a convenience never before possible.

CORTROPHIN-ZINC

AN ORGANON DEVELOPMENT

- **Action lasts at least 24 to 72 hours**
- **Enhanced potency**
- **Easy to administer**
- **Aqueous suspension**
- **Needs no warming**
- **May be injected through fine needle**
- **Fewer overdosage side effects**

CORTROPHIN-ZINC

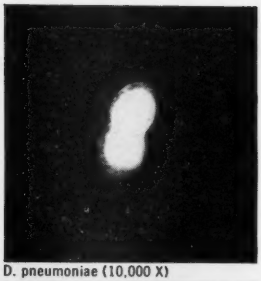
AN ORGANON DEVELOPMENT

Available in 5-cc vials containing 40 U.S.P. units of corticotropin per cc with 2.0 mg of zinc.

Organon INC. • ORANGE, N. J.

The organisms commonly involved in

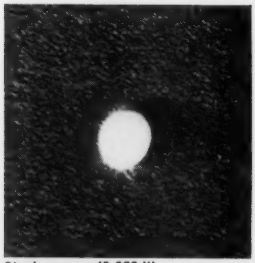
Bronchopneumonia



D. pneumoniae (10,000 X)

K. pneumoniae (13,000 X)

H. pertussis (7,500 X)



Staph. aureus (9,000 X)

Str. pyogenes (8,500 X)

H. influenzae (16,000 X)

Upjohn

ELECTRON MICROGRAPHS

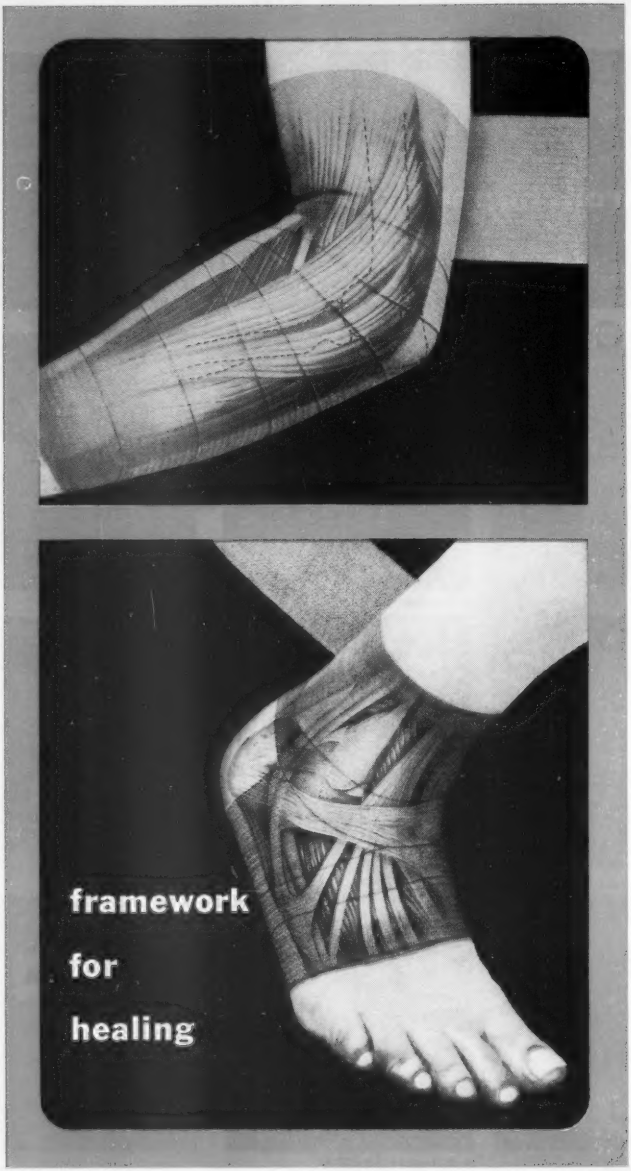
***All* of them are included in the more than 30 organisms susceptible to broad-spectrum**

PANMYCIN*

HYDROCHLORIDE

100 mg. and 250 mg. capsules • 125 mg. and 250 mg./tsp. oral suspension (PANMYCIN Readimixed)
100 mg./cc. drops • 100 mg./2 cc. injection, intramuscular
100 mg., 250 mg., and 500 mg. vials, intravenous

*TRADEMARK, REG. U. S. PAT. OFF.—THE UPJOHN BRAND OF TETRACYCLINE



ACE® RUBBER-ELASTIC BANDAGE

elasticity for compression

body for support

B-D BECTON, DICKINSON AND COMPANY, RUTHERFORD, N. J.

ACE, T.M. REG. U.S. PAT. OFF.

For the relief of common dermatoses...

particularly with the older patient

ALMA-TAR*

(Juniper Tar Compounds, Almay)

Affords a Complete Formulary of Tar Products for the Management of

SENILE PRURITUS, ECZEMAS, SEBORRHEA and SIMILAR DERMATOLOGIC CONDITIONS

in pruritus "Tar baths are antipruritic in cases of generalized itching dermatoses and in generalized eczemas and psoriasis." ". . . this preparation [Alma-Tar Bath] provides one of the most effective and cleanest ways of preparing tar baths."

Sulzberger, M. B., and Wolf, J.: Dermatology: Essentials of Diagnosis and Treatment, Chicago, The Year Book Publishers, Inc., 1952, p. 42.

in seborrhea "Tar soap [or shampoo], rather than any oil shampoo, may be used after local medication."

Freeman, H. E.: South, M. J. 47:940 (Oct.) 1954.

ALMA-TAR BATH

(Juniper Tar Solution)

35% Oil of Cade by weight . . . in water-miscible base; 2 to 4 tbs. should be added to tub of water; patient should be immersed for 10 minutes with water and room at body temperature. Supplied in 8 fl. oz., qt., and gal.

ALMA-TAR OINTMENT

(Juniper Tar Ointment)

4% Oil of Cade in a bland base . . . may be applied topically when necessary to alleviate symptoms. Supplied 1 oz. tube, 4 oz. and 1 lb. jar.

ALMA-TAR SHAMPOO

4% Oil of Cade in mild shampoo. Supplied 8 fl. oz., qt.

ALMA-TAR SULFONATED OIL

5% Oil of Cade in sulfonated castor oil and water . . . indicated when soap is not desired. Supplied 8 fl. oz., qt.

ALMA-TAR SOAP (NEW)

10% Oil of Cade in mild soap base. Supplied as 4 oz. cake.

SAMPLES OF ALMA-TAR BATH AND SHAMPOO AND COMPLETE LITERATURE ON REQUEST

*TRADE MARK

And where Crude Coal Tar Products are therapeutically preferable . . . The Almay Formulary Includes these Specific Products . . .

L.C.D. SOLUTION

(Coal Tar Solution)

20% Crude Coal Tar by weight . . . 85% alcohol by volume. Supplied 4 fl. oz., pt., gal.

L.C.D. OINTMENT

1.2% Crude Coal Tar in nonstaining base. Supplied tubes, 1 oz.; jars, 1 lb., 5 lb.

COMPLETE LITERATURE ON REQUEST

ALMAY® Division of Schieffelin & Co. New York 3, N. Y.

TO LEVEL THE PEAKS AND VALLEYS OF YOUR LABILE HYPERTENSIVES

New RAUVAL

RAUWOLFIA SERPENTINA TRADEMARK

Because RAUVAL contains *all* of the rauwolfia alkaloids, it provides a *natural* balance between hypotensive and sedative effects, and symptomatic relief is remarkably prompt.

This balance makes RAUVAL the drug of choice for patients with labile hypertension, especially when accompanied by tachycardia or neurosis.[1,2]

Supplied: Bottles of 100 and 1000 tablets in two strengths:
50 mg. s.c., red
100 mg. s.c., pink (double strength)

1. Wilkins, R. W.: Ann. Int. Med. 37:1144, Dec., 1952.
2. Wilkins, R. W., and Judson, W. E.: New England J. Med. 248:48, Jan. 8, 1953.

THE VALE CHEMICAL CO., INC.
pharmaceuticals
ALLENTOWN, PENNSYLVANIA

In very special cases
A very superior Brandy

Specify 84 PROOF

★ ★ ★

HENNESSY

THE WORLD'S PREFERRED
COGNAC BRANDY

For a beautifully illustrated book on the story of Hennessy, write—

Schieffelin & Co., Dept. HT, 30 Cooper Square, N. Y. 54

when every step seems steep!

Home LIFT

The Shepard HomeLIFT, the quality residence elevator, and the EscaLIFT, a residence stair climber, give new life to patients who cannot or should not climb stairs. Safe–easy to install–simple to operate–no special wiring required. Help your patients gain greater freedom and end stair climbing effort. Write for complete literature.

EscaLIFT

SHEPARD ELEVATORS

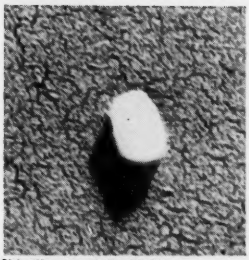
THE SHEPARD ELEVATOR CO.
5113 Brotherton Road
Cincinnati 9, Ohio

"Manufacturers of high-speed passenger elevators for commercial buildings"

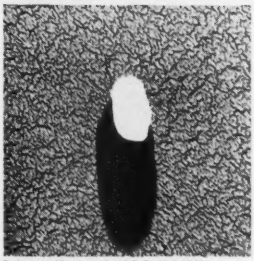
The organisms commonly involved in

Gastroenteritis (Diarrhea)

Shigella dysenteriae (12,500X)

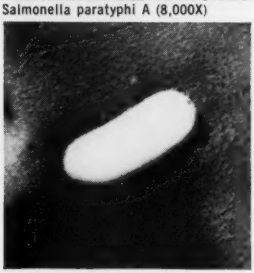


Shigella sonnei (13,000X)



Salmonella paratyphi A (8,000X)

Salmonella paratyphi B (6,500X)



E. coli serotypes (8,000X)

Upjohn

ELECTRON MICROGRAPHS

***All* of them are included in the more than 30 organisms susceptible to broad-spectrum**

PANMYCIN*

HYDROCHLORIDE

100 mg. and 250 mg. capsules • 125 mg. and 250 mg./tsp. oral suspension (PANMYCIN Readimixed)
100 mg./cc. drops • 100 mg./2 cc. injectable, intramuscular
100, 250, and 500 mg./injection, intravenous

*TRADEMARK, REG. U.S. PAT. OFF.—THE UPJOHN BRAND OF TETRACYCLINE

Cogentin®

METHANESULFONATE (BENZTROPINE METHANESULFONATE, MERCK) (TROPINE BENZOHYDRYL ETHER METHANESULFONATE)

rated the best single drug in parkinsonism[1]

MAJOR ADVANTAGES: Effective against rigidity.[2] Counteracts muscle spasm.[3] "Good against major tremor."[3] "Safe."[2]

COGENTIN helps control palsied hands—often with a single daily dose

COGENTIN affords maximal symptomatic relief in parkinsonism – whether postencephalitic, idiopathic or arteriosclerotic.

For alleviating *spasm* and *cramps*, *rigidity* and *contracture* of parkinsonism, COGENTIN is "better than any drug currently available."[4]

Severe tremor, unaffected by standard medication, improved in many cases when COGENTIN was given.[5]

COGENTIN is reported to be *safe* in all forms of parkinsonism[2] Even the elderly tolerate it well.[5] It "does not cause drowsiness" or similar side effects during the day.[4]

Dosage: Effective symptomatic relief may usually be obtained with a single 1 or 2 *mg.* dose taken orally before retiring. Each quarter-scored tablet contains 2 *mg.* COGENTIN.

References: 1. M. Clin. North America 38:485 (March) 1954. 2. Neurology 2:233 (May-June) 1952. 3. J.A.M.A. 156:680 (Oct. 16) 1954. 4. Parkinsonism and its Treatment. Phila., J. B. Lippincott Co., 1954, pp. 87-88. 5. Neurology 3:361 (May) 1953.

SHARP & DOHME

Philadelphia 1, Pa.
DIVISION OF MERCK & CO., INC.

Add Elegance and Appetite-Appeal

to the Sick-Tray

THERE'S anticipated pleasure when the patient sees an appetizing, colorful glass of wine on the table or tray—wine adds that touch of "elegance" which gives a psychological lift at a time when it is most needed.

And there are also well-authenticated physiological reasons to account for the valuable role of wine as a nutrient beverage for the convalescent and the aging patient:

Recent controlled research shows that just 2 or 3 oz. of a dry wine can markedly increase olfactory acuity, increase the desire for food (as in anorexia) and actually aid digestion.

The effect of wine on free and total gastric acidity has been found to differ markedly from that of plain alcohol. Because of the buffering action of its phosphates, organic acids and tannins, the action of wine is gentler and more prolonged.

Wine is also notable for other desirable vasodilating, diuretic, and relaxant properties, and helps to allay restlessness and irritability in the sick and elderly.

A little Port or Sherry at bedtime affords a valuable aid to normal sleep and may obviate the need for sedative medication.

Recent results of laboratory and clinical research on the medical attributes of wine have been condensed into a small brochure entitled "Uses of Wine in Medical Practice." A copy is available to you—at no expense—by writing to: Wine Advisory Board, 717 Market Street, San Francisco 3, California.

for the "Sippy-diet" patient

a welcome *(and often necessary)* change from "milk-and-cream"

MULL-SOY® Powdered

Pioneer soy alternative to milk... reported to be "noticeably more soothing to the upper gastrointestinal tract and seemingly easier to digest."[1] Comparable to milk in buffering[2] and nutritional[3] qualities. Contains no cholesterol... and costs the patient *much* less than milk-and-cream. Easy to prepare—4 level tablespoonfuls to 8 oz. water. In 1-lb. tins at all drug outlets.

1. Balfour, D. C., Jr.: Am. J. Gastroenterol. 22:181, 1954. 2. Burke, J. O., et al.: Internat. Rec. Med. & Gen. Practice Clin. 167:587, 1954. 3. Sternberg, S. D., and Greenblatt, L. J.: Ann. Allergy 9:190, 1951.

Are you wondering how MULL-SOY Powdered tastes? Return this coupon for professional trial samples and see for yourself how *pleasant* it can be for your milk-weary or milk-intolerant ulcer patients.

THE BORDEN COMPANY
Prescription Products Division, Dept. 201
350 Madison Avenue, New York 17, N. Y.

Please send to me, without charge, four 4-oz. tins of MULL-SOY Powdered.

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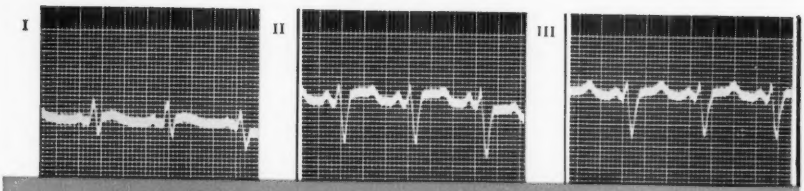
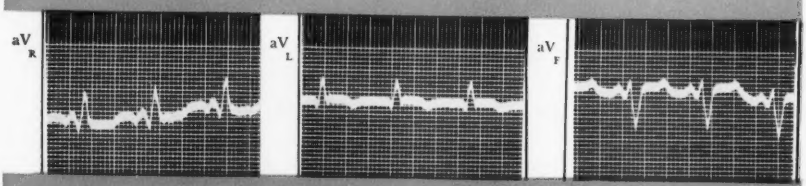


REDUCE MORTALITY

in Myocardial Infarction with *Severe* Shock

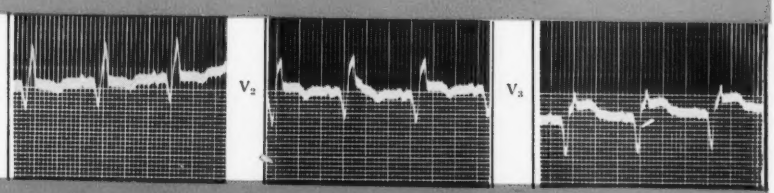


by the early use of

LEVOPHED®

BITARTRATE

the most powerful pressor antidote for shock



SUPPLIED:

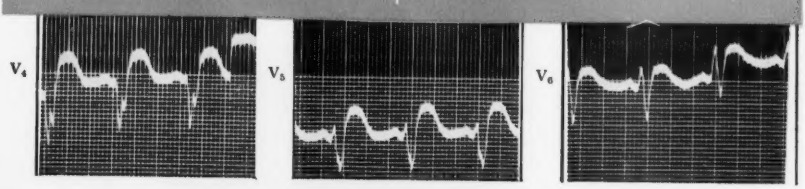
Levophed bitartrate 0.2% solution in ampuls of 4 cc., boxes of 10, to be administered in 1000 cc. of 5% dextrose solution in distilled water or 5% dextrose in saline solution.

Winthrop-Stearns INC.

New York 18, N. Y. Windsor, Ont.

Write for detailed literature.

Levophed, trademark reg. U. S. Pat. Off., brand of levarterenol



AGING CHANGES THE BONE PICTURE

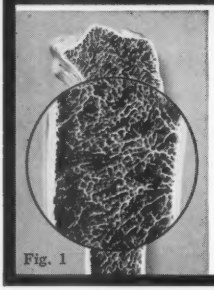


Fig. 1

TIBIA,
magnified sagittal section

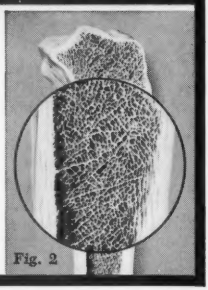


Fig. 2

Estrogen and androgen are vitally concerned with the preparation and recalcification of bone matrix, and this readily explains why declining sex hormone production associated with aging so frequently leads to postmenopausal and senile osteoporosis. Note typical atrophic changes characteristic of postmenopausal osteoporosis (fig. 1), in contrast to normal bone matrix (fig. 2).

Not generally realized is that some degree of osteoporosis is almost "physiologic" after the menopause, and that this bone disorder is present clinically in about 10 per cent of all women over 50 years of age.*

With combined estrogen-androgen therapy, pain in the spine and other bones is markedly relieved in a matter of weeks or months. The prognosis for bone recalcification, following extended periods of treatment, is good.*

Estrogen and androgen as combined in "Premarin" with Methyltestosterone provide a dual approach for maximum efficiency in treating osteoporosis. A brochure outlining full details of therapy is available on request.

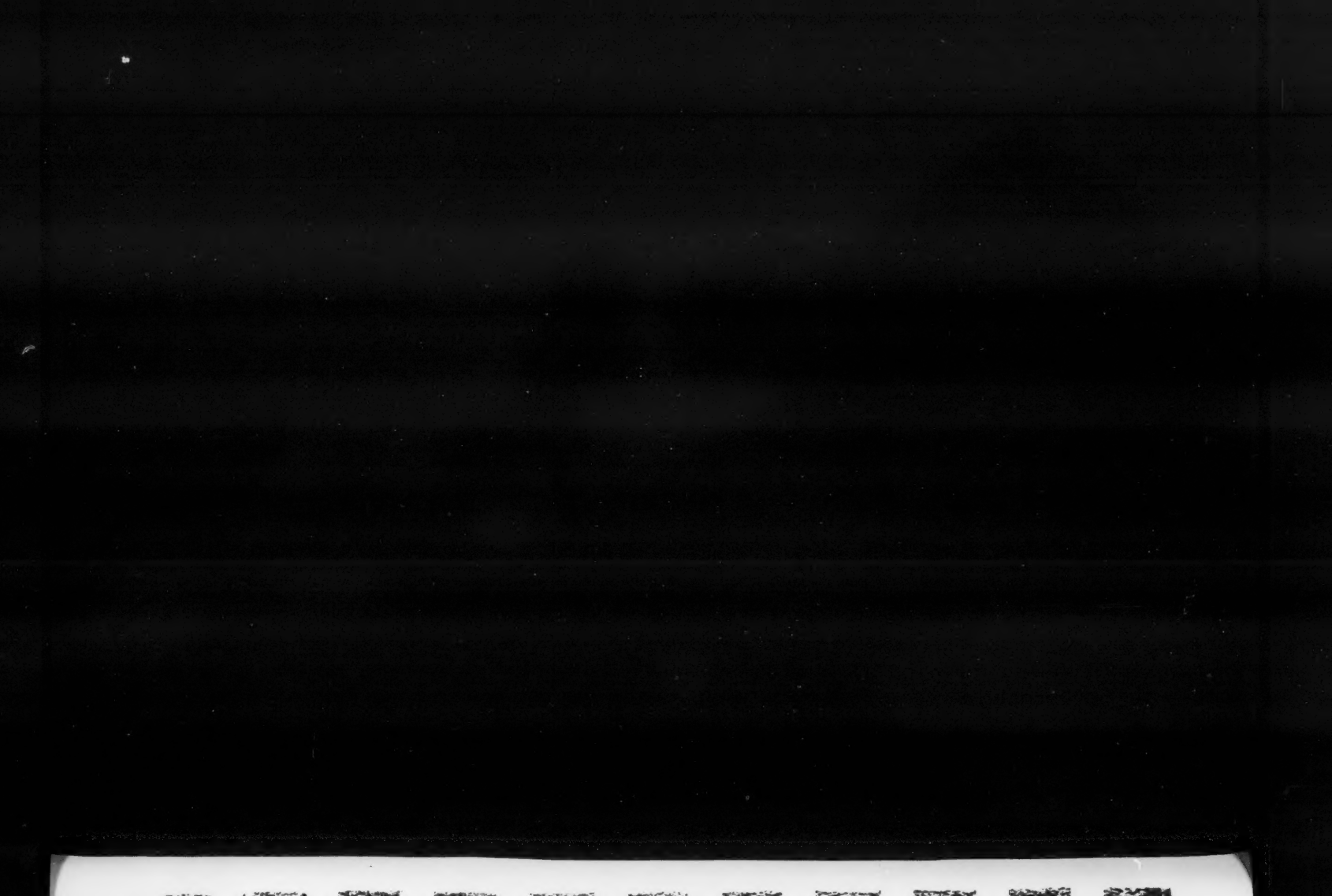
*Reifenstein, E. C., Jr., in Harrison, T. R.: Principles of Internal Medicine, Philadelphia, The Blakiston Company, 1950, p. 655.

"Premarin" with Methyltestosterone is supplied in two potencies: the *yellow* tablet (No. 879) contains 1.25 mg. of conjugated estrogens equine and 10 mg. of methyltestosterone; the *red* tablet (No. 878) contains 0.625 mg. and 5 mg. respectively. Both potencies are available in bottles of 100 and 1,000 tablets.

"PREMARIN" with METHYLTESTOSTERONE

for combined estrogen-androgen therapy

Ayerst

5424

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